

OBSERVATIONS
ON
THE NATURE AND TREATMENT
OF
POLYPUS OF THE EAR.

E. H. CLARKE, M.D.

L. C. III, 11

29. D 29

Dr. O. W. Holmes
from E. W. Clarke

DEPOSITED IN
POSTON MEDICAL LIBRARY,
BY
HARVARD COLLEGE.
LIBRARY.

1871
March 1st

OBSERVATIONS
ON
THE NATURE AND TREATMENT
OF
POLYPUS OF THE EAR.

BY
EDWARD H. CLARKE, M. D.,
PROFESSOR OF MATERIA MEDICA IN HARVARD UNIVERSITY, MEMBER OF THE
MASSACHUSETTS MEDICAL SOCIETY, FELLOW OF THE AMERICAN
ACADEMY OF ARTS AND SCIENCES, ETC., ETC.



BOSTON:
TICKNOR AND FIELDS.
1867.

Entered according to Act of Congress, in the year 1867, by
EDWARD H. CLARKE,
in the Clerk's Office of the District Court of the District of Massachusetts.



UNIVERSITY PRESS: WELCH, BIGELOW, & Co.,
CAMBRIDGE.

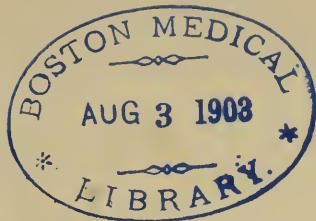
P R E F A C E .

THE observations on polypus of the ear contained in this paper were made a few years ago. Owing to the engrossing labors of general practice, and the still more engrossing duties of collegiate instruction, they were laid aside. The interest which diseases of the ear have recently excited, both in this country and in Europe, especially in Germany, recalled my attention to these observations, and have induced me to collate them, and give to them their present form. They are not put forth as a complete account of polypus of the ear, but simply as a contribution to the study of it. The remarks on treatment, which are appended to the cases, and form the principal portion of the Second Part, are founded, not only on the cases recorded in the First Part, but also on my experience in the treatment of polypus since the cases were recorded. If this brief Memoir, notwithstanding its imperfections, should throw any light,

however little, upon the pathology or treatment of a form of disease, not less obstinate and disagreeable in itself than it is injurious to the ear and the hearing, I shall be more than satisfied.

For the microscopic examinations and drawings with which this paper is enriched I am indebted chiefly to my colleagues, DR. JOHN BACON, and DR. CALVIN ELLIS. For one or two of them my thanks are due to DR. JOHN C. DALTON, of New York.

ARLINGTON STREET, BOSTON, NOV., 1867.



PART FIRST.

RECORD AND ANALYSIS OF CASES.

THE following observations refer only to non-malignant growths of the ear. It is well known that malignant ones may appear in the ear-passages as well as elsewhere; but their presence in that situation is exceptional. They are not the sort of growths which are commonly met with there, and with which not merely the specialist, but every practitioner, has more or less occasion to deal.

Polypi of the ear are described by all systematic writers on aural diseases. Their descriptions, however, are by no means precise, and are sometimes confused. They do not agree in their classification of these growths. They give very little account of their intimate structure, or of the causes which lead to them. The natural result of this is that the methods of treating these important affections of the ear are various and often ineffectual.

In the simple matter of classification, there is a diversity almost as great as the number of writers. Kramer's classification is confused. It is difficult to ascertain whether he means to describe only one variety, or two or three varieties. Itard does not attempt any formal classification. Mr. Wilde describes six varieties. He includes among them inalignant growths of the ear, and those fleshy vegetations, *excroissances charnues*, which are sometimes called fungus and sometimes granulations. Mr. Toynbee has discovered three varieties, viz. raspberry cellular polypus, fibro-gelatinous polypus, and globular cellular polypus. His classification appears to be founded

partly on the color, partly on the shape, and partly on the structure of these growths. Mr. Harvey describes two kinds, which he calls true polypi, and false polypi. He states, that by the former he means fibro-plastic tumors of the ear-passage. He does not give the structure of the latter. According to Triquet, there are three varieties of polypi, which he calls polypi of the cavity of the tympanum, polypi of the external meatus, and polypi of the membrane of the tympanum. His principle of classification is the insertion or point of attachment of the growth. Bonnafont speaks of fibrous polypi, of carcinomatous polypi, of polypi of the cavity of the tympanum, of the membrane of the tympanum, and of the external meatus. W. Rau divides polypi into two sorts, which he calls soft polypi and hard polypi. The former he describes as mucous, the latter as fibrous growths. H. Valleroux, like Rau, describes two varieties, viz. mucous and fibrous polypi. Anton von Tröltsch, one of the best and latest writers on the ear, comprehends all forms of polypoid and fungoid growths of the ear, not including malignant ones, under the general name of polypi.

A similar uncertainty, or want of agreement, exists in the statements of writers with regard to the causes of aural polypi. Mr. Toynbee says, that a polypus is "generally the result of long-continued irritation of the dermoid layer" of the meatus, or of "chronic inflammation of the mucous membrane of the tympanum," or of "obstruction of the Eustachian tube." Triquet states, that "polypi of the ear are developed almost always after chronic suppuration of the auditory apparatus." Tröltsch says, "They have their origin only after a long-continued purulent process. It is also certain," he adds, "that an otorrhœa may be maintained for a long time by such a polypus, since this will secrete pus freely, and continue to keep the morbid tissue beneath in its irritated condition." Bonnafont regards a polypus of the ear as a "morbid pro-

duction, due to an alteration of the tissues upon which it is developed"; and adds, that, as soon as it is removed, attention should be paid to the cause which has led to it. Harvey says, that true polypi "are merely growths which may consist with perfect general health," and, therefore, require "only to be removed, and the ulcer treated on general principles." But he regards false polypi as "*per se* evidence of disordered health; and, therefore, all attempts at removing them without constitutional treatment must prove abortive."

These citations — and similar ones might be multiplied from various authors — go to show that aural surgeons are not yet agreed as to the causes of polypoid growths of the ear. While nearly all look upon them, not as purely local affections, but as the result of some morbid process, there seems to be very little precise knowledge of what that morbid process is. Hence there is difference of opinion as to the treatment of polypi of the ear after removal. All agree upon the importance of destroying them, but some surgeons employ only a local treatment, while others rely chiefly on constitutional measures.

Very little is known, or at least very little is said by writers, of the intimate structure of polypi of the ear. Their gross appearances have been described, but their anatomical structure and microscopical characters have not been carefully studied. Von Tröltzsch circumscribes his account of the structure of these growths within a dozen lines. Mr. Harvey is equally reticent. Mr. Wilde has given an admirable description of the shape and color of these growths, but without describing their structure. Kramer, Triquet, Bonnafont, and Rau have scarcely anything to say on this point. Mr. Toynbee is more full than any writer I have met with. I shall have occasion to refer to his account of the microscopical characters of fibro-gelatinous polypi of the ear in another place. He

only gives, however, a very brief account of the structure of the other two kinds which he describes.

A more extended and careful study of these growths than they have yet received will elucidate these and other doubtful points that might be mentioned with regard to their history and character. It is with the hope of adding something, however little, to our knowledge of them, that the following observations are presented. I am aware that the cases contained in this paper are given in great detail, but I could not abridge them without omitting some of the data that are important. They are selected as illustrations of the different varieties of non-malignant growths of the ear. I might have presented a larger number, but they would have added more to the size than to the value of this Memoir.

CASE 1. — *Fibrous polypus of the left meatus of an adult with otorrhœa. Removal. Permanent relief.*

Miss S. P., American, æt. 30, with dark hair and eyes, of healthy aspect, good general health, and resident in Boston, applied for relief of disease of the left ear.

She reported no hereditary deafness. Five or six months before calling on me, she perceived slight tinnitus in her left ear. This was soon followed by a moderate discharge from the same ear, which, however, did not trouble her seriously. Ten days before applying for relief, she was attacked with severe pain in her left ear, accompanied with tenderness and swelling. This was partially relieved after an increase of the discharge. Still, however, she suffered from occasional otalgia, and her ear was uncomfortable. Her right ear was not disturbed. Her fauces and tonsils were normal.

On examination, the auricle of the left ear was found to be healthy. The meatus was so completely plugged up by a hard, blunt tumor, that the membrana tympani could

not be seen. The tumor was movable, not sensitive nor bleeding when touched by a probe. It was attached by a small root to the walls of the meatus, near the membrana tympani. She heard the ticking of my watch only when pressed on her left ear; but at a normal distance from her right one.

The tumor was removed by the wire snare. The growth, after removal, measured six eighths of an inch in length, and two eighths in diameter. It was not invested by any distinct membrane, but presented a membranous surface. It was evidently covered by a pavement epithelium represented in Fig. 1. Internally the tumor was firm, semi-transparent, and nearly homogeneous-looking. Its substance, examined under the microscope, exhibited, 1st. Indistinct fibrous tissue. 2d. Small round granulated bodies, something like nuclei. 3d. Larger, oval, smooth bodies which were evidently nuclei, with distinct nucleoli. 4th. Spindle-shaped cells, having a nucleus identical with the last mentioned, apparently the cells of fibrous tissue in process of development. For these appearances see the annexed plates, Figs. 2, 3, and 4.

After the removal of the growth, she heard the ticking of my watch at the distance of between five and six feet. The root of the polypus in the meatus was cauterized with the solid nitrate of silver. The cauterization was repeated on the second and third day after the operation. The meatus was daily cleansed by syringing, and a solution of acetate of lead, of the strength of ten grains to an ounce of water, was instilled into the ear every day. Two days after the operation, the membrana tympani could be seen. It was of a dull white color. The walls of the meatus were moderately red and swollen. The above treatment was continued for twelve days. At the end of that time, the discharge was very slight. There was no otalgia, nor ten-

derness, nor any appearance of the polypus, and the treatment was omitted. Ten days from this time, the discharge had increased. The walls of the meatus were red and swollen; but the polypus was not visible. The lead wash was resumed, and counter-irritation behind the ear by means of cantharides was advised. This treatment was followed for nearly four weeks. By that time, the otorrhœa had ceased. The walls of the meatus were white; and its diameter nearly normal. A dry cicatrix covered the spot where the polypus was attached. The membrana tympani was free from redness, and of a dull color. All treatment was discontinued. I examined the ear a year after this,—my watch was heard two feet from the ear. The tissues of the ear appeared healthy, except some opacity of the membrana tympani.

CASE 2. — *Fibrous polypus of the right meatus in a child, with otorrhœa. Removal and permanent relief. Epithelial polypus in the same ear three years later. Removal of this, and relief.*

E. B., a male child, æt. $4\frac{1}{2}$, American, of good general health, with fauces, tonsils, and cervical glands normal, was brought to me in consequence of a bunch growing in his right ear. He had suffered for several weeks from an occasional slight pain in that ear, which came on without apparent cause, and which was generally relieved by fomentations of hops or poppies. There had also been a slight, non-purulent discharge from the same ear, for two or three weeks.

On examination, the left ear appeared to be healthy. The meatus of the right ear was filled by a hard, fleshy tumor of a dark red color. It was firm to the touch. A probe could be passed completely around its outer portion, without producing much pain, or any bleeding. The exact point of its attachment could not then be ascertained.

It was extracted with the forceps, the patient being etherized. It proved to be an oblong, circular tumor, rather more than half an inch in length, and of sufficient diameter to fill the meatus completely. Its root was small. When cut into, it felt firm to the knife. Its attachment was now found to be to the walls of the meatus.

It had a red color, due to infiltrated blood. Under the microscope it was seen to be composed of bundles of fine, parallel fibres, having the characters of white fibrous tissue. The fibres were, as usual, often wavy, but preserved their parallelism. Interspersed with the bundles were many groups of nucleated fibres, and the fusiform cells and nuclei which precede the formation of fibrous tissue. The tumor contained no yellow elastic tissue, or other anatomical elements.

There was very little bleeding after the operation. The root of the polypus was cauterized with a solution of argenti nitras. Directions were given to instil into the meatus, four or five times a day, a solution of acetate of lead, of the strength of eight grains to an ounce of water. Syringing often enough to keep the meatus clean was also directed. This treatment was continued for eight days. At the end of that time, the otorrhœa had ceased; there was no reappearance of the growth, and no return of otalgia or uncomfortable sensations about the head. The meatus was normal, except a little redness of its walls. The membrana tympani was of a dull color, with epidermic scales on its surface. The youth of the patient prevented any accurate determination of the hearing power of that ear. Treatment was then discontinued.

Six weeks later, the patient had an attack of otalgia in the same ear, the right one. On examination, I found a quantity of thick, curdy matter in the right meatus. Its walls, and the adjoining membrana tympani, were moderately

red. There were no foreign growths. After using a weak solution of lead for a short time, the injection of the meatus, the pain and the discharge ceased.

For six months after this, the ear was apparently well. Now and then there was a slight degree of itching of the meatus, but no redness, pain, or discharge. At the end of this time, in the month of September, the lad complained again of otalgia of the right ear. The pain was attended with redness and swelling of the meatus, and was followed by discharge. The otorrhœa which then commenced continued with varying intensity for the next three years. Notwithstanding a persistent local and general treatment, comprising various astringent and caustic and stimulating lotions for the ear, counter-irritation back of it, iron, iodine, &c., internally, the disease of the dermal tissue of the meatus not only continued, but gradually invaded the membrana tympani, perforated it, and affected more or less the cavity of the tympanum. During this period no foreign growth appeared. At the close of it, — that is, nearly four years after the above-described polypus had been removed, — there was an attack of severe pain in the same ear, followed by a copious discharge from it. Soon after this attack, an epithelial polypus sprung up from the posterior wall of the meatus. Caustics were unavailingly applied to it, and therefore I removed it with the wire snare. It was about the size of a grain of Indian corn, and attached by a broad base.

A microscopic examination of the tumor showed that immediately below the normal skin, there was a soft, reddish-yellow, semi-gelatinous substance, composed of fibroid and granular matter, enclosing nuclei and cells, not so well defined as in many cases, but evidently epithelial in their character.

After its removal, burnt alum was freely applied to the posterior wall of the meatus. In a few days, no signs of

the growth were visible. The otorrhœa, however, persisted for several years. The meatus was carefully kept clean, and appropriate local and general treatment employed. The meatus and cavity of the tympanum gradually assumed a healthier aspect. I have examined the ear, occasionally, up to the present time. Ten years after the removal of the epithelial growth, and about fourteen after the removal of the fibrous one, no other foreign growth had appeared. The discharge was so slight, and there was so little irritation, that no local or other treatment was required. The perforation of the membrana tympani continued, and the walls of the meatus remained thick and narrow.

CASE 3. — *Fibrous polypus of the right meatus. Extraction. Probable recovery.*

C. A., an American boy, æt. 10, applied for relief in consequence of an otorrhœa of six years' duration. His health had been delicate in infancy. When four years old he had measles. Previously, his hearing was good. Two or three months after convalescence from measles, his hearing became impaired; and at the same time a discharge commenced from the meatus of the right ear. This had continued up to the time of my seeing him, with the exception of occasional short intervals of cessation. There had never been any discharge from the left ear. That from the right ear was reported to be generally offensive, often thick and curdy, and sometimes bloody. He had never suffered from otalgia. Since infancy his general health had been good. He was a boy of light hair and complexion, with a ruddy and healthy aspect, and of small stature for his age. His tonsils and cervical glands were not enlarged. He heard the ticking of my watch about five inches from his left ear, and not at all on his right one.

The left auricle, meatus, and the ceruminous secretion,

were normal. The adjoining membrana tympani was clear and translucent. Near its circumference there were two or three red lines. The right meatus was filled with thick and offensive matter. After its removal, the passage was found to be obstructed by a polypoid growth. This was not painful to the touch. It did not bleed easily. It had a gelatinous appearance, and was attached by a pedicle to the upper wall of the meatus, at a point about equidistant from the orifice and the membrana tympani. It was easily extracted with the forceps. After removal, it measured about half an inch in length. It was of a firm texture, and of a regular, oblong shape.

The tissue of the polypus was soft, but somewhat elastic, and its color grayish-white; in parts, it was infiltrated with blood. Examined by the microscope it appeared to be a fibro-plastic tumor, chiefly composed of fusiform cells, lying side by side. Ovoid cells and free nuclei abounded in some parts, and a few long fusiform fibres were seen, but no completely developed fibrous tissue occurred.

The root of the polypus was cauterized with solid nitras argenti, and a solution of acetas plumbi, of the strength of ten grains to an ounce of water, ordered for daily instillation into the meatus. I never saw the patient afterwards, and therefore presume that he had no further difficulty.

CASE 4. — *Fibrous polypus of the left meatus in an adult.*
Extraction. Recovery.

Mr. T. B., a German, æt. 25, of good general health, light hair and complexion, and without any affection of the throat or cervical glands, suffered from otorrhœa of the left ear from the age of eleven till the time I saw him. He knew of no cause for the discharge, and reported that it had continued, with slight interruptions, during fourteen years. It was described as having been offensive, not very

copious, and moderately thick. During the latter part of the above-mentioned period it had grown worse.

The appearance and hearing of the right ear were normal. He heard my watch tick about three inches from his left ear. The left auricle was healthy. A fleshy tumor completely filled the left meatus. It was firm to the touch of a probe, not easily bleeding nor sensitive, and attached to the superior and posterior wall of the meatus, near the membrana tympani. It was extracted with the wire snare. After extraction, it was found to be pyriform, seven eighths of an inch long, one half of an inch in diameter at its broadest part, and with a broad base.

A microscopical examination showed that the external portions of the tumor were composed of small nuclei, containing small nucleoli; of cells more or less elongated, in which the same nuclei were seen; and of a few slightly granular corpuscles. Vid. Fig. 5. The deeper-seated portions presented a delicate fibrous structure in which were numerous minute globules and granules. Vid. Fig. 6.

Directly after extraction, solid nitras argenti was applied to the root of the polypus. It was found that the membrana tympani had been destroyed. The walls of the meatus were red and rough. They resembled a cul-de-sac, with a congested and secreting surface. The patient was directed to keep the meatus clean by syringing, and to instil into it, four times a day, a solution of acetas plumbi, of the strength of ten grains to an ounce of water. During a few weeks after the extraction of the polypus, it attempted to reproduce itself. On several occasions, I extracted fresh portions of it. At the end of a fortnight, the solution of lead was changed to the liquor. alum. comp. Ten days later, this was changed to an aqueous solution of iodine, of the strength of three grains to an ounce of water, dissolved by means of the iodide of potassium, which was instilled into the meatus

twice daily. Occasionally, also, a solution of *nitras argenti* of the strength of a dram of the nitrate to a dram of water, was rubbed into the walls of the meatus, along their whole extent.

Under this treatment the polypus ceased to grow, and the meatus assumed a healthier aspect. Seven weeks after the operation for extraction, the otorrhœa ceased, there was no appearance of the polypus, and the meatus was dry. Local treatment was then discontinued.

Eight months later, I examined the ear again. There had been no return of the discharge, or disturbance in the ear. There was no foreign growth in it. There was a moderate secretion of wax. The walls of the meatus were white. A narrow rim of the *membrana tympani* only remained. A portion of the malleus was *in situ*. The mucous membrane of the cavity of the *tympanum* was of a pale pink color, approaching white. He heard my watch tick at the distance of one foot from the ear.

CASE 5. — *Epithelial polypus of the left meatus, following a chronic otorrhœa. Removal of the polypus. Amelioration of the otorrhœa.*

Miss H., an American, æt. 23, with light hair, eyes, and complexion, and of good general health, had scarlatina severely when five years old. This was followed by otorrhœa from both ears, and partial deafness. These had continued up to the time of my seeing her. The otorrhœa was reported to be variable, — sometimes copious and sometimes nearly absent. The audition was also reported variable. In clear weather, and when she was free from a cold, it was pretty good. In opposite conditions it was bad. She had been treated with syringing, various astringent washes, counter-irritation, etc., without much relief. Since the age of twenty, she thought her hearing had improved.

At the time of examination, she heard the ticking of my

watch two and a half feet from her right ear, and two inches from her left one. The right auricle was healthy. The right meatus held a number of dark and dry crusts, attached to its sides. The membrana tympani was perforated centrally. There was then no discharge. The left auricle was normal. The left meatus, like the right, was lined with crusts. A small, pedunculated polypus was attached to its posterior wall, about one quarter of an inch from the external orifice. The left membrana tympani was also perforated. Each perforation was of nearly the size of a small pea. There was a slight discharge from the left meatus. She could easily make air pass through the perforations by a forced expiration. The polypus was removed with the forceps.

It was about as large as a grain of maize. Examined by the microscope, the tumor appeared to be composed of elongated fusiform or conical cells, having a distinct, nucleated, oval nucleus. There was also an abundance of these nuclei, both isolated, and crowded together in groups, without any appearance of cells surrounding them. There were some fibrous tissue also to be seen, and a few blood-globules. The tumor altogether resembled an epithelial growth, with some mixture of a fibrous structure. Vid. Fig. 7.

After the extraction of the polypus, the surface of its root in the meatus was cauterized every other day for twelve days. For the same period, a solution of acetate of lead, two grains to an ounce of water, was instilled into the meatus twice a day. At the end of this time, no appearance of the polypus was visible. The walls of the meatus presented a healthier aspect. The organic changes in each membrana tympani of course remained. All local treatment, except syringing the meatus often enough to keep it clean, was discontinued. Five months later, there was no reappearance of the polypus. Her hearing remained about the same.

CASE 6. — *Epithelial polypus of the left meatus, following acute inflammation of the same part. Extraction. Recovery.*

Mr. C. W. B., an American, æt. about 45, trader, with dark hair and eyes, and of good general health, was exposed for an hour or longer to a current of cold air, which struck the left side of his head. Soon after this, he suffered from severe pain in the left ear. The otalgia was accompanied with swelling and tenderness of the left meatus. He lost his appetite and sleep. At the end of a week, there was a moderate discharge from the left meatus, followed by partial relief of his suffering. The discharge continued. After a week or two longer, the swelling, tenderness, and pain began to increase, and at length became intolerable. He got no rest by night or day.

At this stage of his difficulty, four weeks after exposure to the current of cold air, he called upon me. I found the outer portion of the left meatus, its orifice, the integuments over the mastoid process, and those for some distance below the ear, swollen and tender. There was some thick, white matter in the meatus. The movements of his jaw produced uneasiness in his ear, but not pain. The membrana tympani could not be seen. Air was heard by the otoscope to enter the cavity of the tympanum. He could hear my watch tick only when pressed on the left ear. The appearance of the right ear and its hearing were normal. The swelling was soft, without apparent fluctuation.

He was put on a low diet. Saline cathartics were ordered. Opiates were given at night. Poultices were applied locally. Seven days later, the pain had disappeared, — the swelling and tenderness had diminished, — but the discharge from the meatus had increased. The lessened swelling of the meatus brought to view a soft, yielding tumor, about a quarter or

a third of an inch from the orifice of the passage. The above-mentioned treatment was now discontinued; and syringing with warm water only advised. Four days after this, the tumor was more defined. It was movable and attached by a broad base. The patient complained of increase of pain in the ear. A leech was applied to the swelling. In three days, the swelling had materially decreased. The growth was then extracted, or rather excised by the wire snare. There was little bleeding.

The portion extracted was about one third of an inch long, and one quarter of an inch in diameter. It was colorless, without perceptible blood-vessels, and of a jelly-like consistence. It proved to be an epithelial tumor, consisting almost entirely of small, nucleated epithelium-cells much compressed, and, also, of a very little elastic fibrous tissue, as in drawing. There were no vessels, nor any ordinary areolar tissue. The exterior of the tumor was covered with a layer of epithelium, whiter and more opaque than that in the interior, but of the same form and size. There was no distinct fibrous envelope. Vid. Fig. 8.

After the excision of the polypus, a plug of lint, moistened with a saturated solution of acetate of lead, was packed into the meatus, so as to compress the cut surface. On the next day, it was removed, and the surface freely cauterized with argentic nitrate. At the same time a blistering cerate was applied behind the ear, and counter-irritation kept up. At the end of another week, the polypus had increased in size, and another portion of it was excised. The solid nitrate of silver was applied to the part every second day, but the disposition of the growth to reproduce itself was not overcome. I, therefore, divided the integuments by a crucial incision at the point of attachment of the polypus, and thrust a piece of pointed lunar caustic, in every direction, into the divided parts. The operation was followed by considerable pain.

After this, there was no reappearance of the polypus, and the discharge ceased. As soon as the swelling disappeared, all counter-irritation back of the ear was left off. A week after the discontinuance of treatment, — that is, five weeks after he called upon me first, and nine weeks after his exposure to cold, — the meatus was nearly of its natural diameter; its walls were smooth and white; the membrana tympani was moderately opaque; there was no otorrhœa; there was slight tinnitus. There was no uneasiness in the ear, and its hearing power was returning.

CASE 7. — *Fibro-plastic polypus of the left meatus. Otorrhœa. Perforation of both membrane tympani. Extraction of the polypus, and cessation of the otorrhœa.*

G. H., a mechanic, German, æt. 35, of good general health, with fauces, glands, and tonsils normal, and of light complexion, applied for relief from pain and discomfort in his left ear. He gave the following history: —

Several years previously, his ears were violently syringed by a physician. The syringing caused great pain, and induced, as he supposed, disease of each ear. Afterwards, he had otorrhœa from both ears, — less from the right than from the left. Three years before applying to me, a London surgeon extracted a polypus, of moderate size, from the left meatus, and also one of large size from the left nostril. Since the operation, his ears have been better than before, though the otorrhœa has continued. Three months before calling upon me, he began to feel pain and discomfort in his left meatus. This increased. The discharge was occasionally bloody.

On examination, his right auricle and meatus appeared in a sufficiently healthy condition. The right membrana tympani was largely perforated. The mucous membrane of the adjoining cavity was slightly congested. The discharge was slight, and of a mucous character. He could not hear my watch on either ear.

The left meatus was plugged up by a polypus, which extended outside of the orifice. It was firm, hard, movable, highly vascular; not sensitive, nor bleeding easily when touched by a probe. I could not then accurately ascertain its point of attachment. There was a good deal of offensive discharge. It was extracted with the wire snare.

The portion removed was nearly an inch long, and one third of an inch in diameter. It was attached by a broad surface. It was composed of a slightly reddish and grayish white, almost gelatinous substance, small portions here and there being discolored with blood, or from effusion. Under the microscope, there were noticed some fibrous tissue, and wavy nuclei of small size, containing small nucleoli; also cells containing similar nuclei. The predominating elements resembled those figured by Lebert, under the head of fibro-plastic growths. Vid. Fig. 9 for these appearances.

After extraction, the cut surface was cauterized with solid *nitras argenti*. The attachment of the polypus to the walls of the meatus could then be seen. The patient was directed to instil into the meatus, four times a day, a solution of *acetas plumbi*, of the strength of ten grains to an ounce of water. The *membrana tympani* of this ear, like that of the right, was found, after the operation, to be largely perforated. Fifteen days later, notwithstanding repeated applications of nitrate of silver, there was a portion of the polypus remaining, which presented a broad surface. A strong solution of alum was instilled into the ear, instead of lead. After three weeks' use of alum, the use of lead was resumed. Caustic was applied thoroughly once a week. This course of treatment was perseveringly followed. The growth was finally destroyed, and the meatus assumed a healthier aspect. Thirteen weeks after the extraction of the growth, the *otorrhœa* ceased, and there were no indications of a reappearance of the polypus. I examined the ear of this patient more than a year later, and it

continued well. His hearing was not improved, — a fact readily explained by the perforation of the membrana tympani, and other organic changes.

CASE 8. — *Epithelial polypus of the left meatus, and of the cavitas tympani. Otorrhœa. Removal of the polypus, and relief. Reappearance of the growth, two years later. Again relieved by treatment. Destruction of the membrana tympani.*

Miss P., American, æt. 18, of good general health, with light hair and complexion, had scarlet fever when two years old. This was followed by otorrhœa of the left ear, which continued, at intervals, till I saw her. Her right ear was normal.

When examined, the auricle of her left ear was normal. She heard my watch tick only when pressed on the ear. There was no tenderness or swelling. The meatus contained a moderate amount of muco-purulent and offensive matter. After syringing this out, a globular growth, not tender nor bleeding to the touch, was discovered, attached by a small pedicle to the posterior wall of the meatus, near the insertion of the membrana tympani. Of the membrane itself, not a trace could be seen. The growth was nearly as large as a grain of maize. A similar and smaller growth was discovered within the cavity of the tympanum, attached to its anterior wall.

A solution of sugar of lead — ten grains to an ounce of water — was ordered to be instilled into the meatus, three or four times a day. This was done with the hope of rendering the growths firmer, and thereby facilitating their extraction. After instilling this into the ear daily, for a week, both growths were extracted with Mr. Toynbee's ring-lever forceps.

The larger polypus was found to consist of a semi-gelatinous, pinkish-white substance, covered externally with an extremely thin white pellicle. It was composed mostly of pale cells, with

nuclei, and very small nucleoli. Some free nuclei were also seen. Vid. Fig. 10. The delicate external pellicle was composed of a granular, amorphous substance, without cell or fibre.

After extraction, the patient was directed to instil the solution of lead, mentioned above, into her ear, several times daily, and to keep the meatus clean. The strength of the solution was gradually increased to fifteen grains of the salt to an ounce of water. As she lived in a neighboring city, where I could not conveniently see her, no regular application of caustic was made. At the end of a month, the root of the growth was visible, and it presented a broader surface than at first. The astringent instillations were then discontinued, and, instead of them, an aqueous solution of iodine, of the strength of two grains to an ounce of water, was used. This was poured into the meatus, three times a day. In a short time the discharge diminished, and, in the course of six weeks, ceased. Five weeks later, it reappeared. The iodine solution was again used. At this time there was no appearance of the growth, but the cavity of the tympanum was congested and unhealthy. In the course of two weeks, a solution of alum was substituted for iodine; and, soon afterwards, the discharge ceased again.

Two months later, — that is, two months after the second cessation of the discharge, and six months after the extraction of the growth, — the walls of the meatus were white. The secretion of wax was normal. The mucous membrane of the cavity of the tympanum was of a pale pink color, excepting its upper portion, which was covered by a white surface, firm to the touch, and not sensitive. There was no growth or discharge. The ticking of a watch could be heard, when pressed closely on the ear.

Her ear continued well for two years. She then caught a severe cold, and, soon afterwards, her left ear again discharged. Four weeks later, I examined the ear, and found that the

upper side of the meatus presented a jagged and ulcerated surface, which extended from a point just within the orifice to the bony portion. There were two small, raspberry-looking growths on this surface, and a few dry crusts. A solution of iodine — one grain to an ounce of water — was applied daily to the ulcerated surface, and the meatus cleansed with the syringe often enough to keep it clean. At the end of six weeks, the fungus had disappeared; the walls of the meatus were white, and there was no discharge. I examined the ear again, two years after this, and there was no appearance of disease, except the destruction of the membrana tympani, &c., previously alluded to. The hearing was not improved.

CASE 9. — *Epithelial growth of left meatus. Otorrhœa. Extraction. Recovery.*

Miss W., American, æt. 16, of delicate general health, light hair, eyes, and complexion, was attacked with a discharge from her left ear, which came on without any apparent cause. After it had continued for four or five months, she applied to me for relief. She had always been troubled with her throat. Her fauces were congested, and tonsils enlarged. The appearance and hearing of her right ear were normal.

The left meatus contained, at the time of examination, a moderate amount of purulent matter. My watch was heard only when pressed on the ear. There was a growth attached to the wall of the meatus, about half an inch from its orifice. The polypus nearly filled the meatus. It was not sensitive, and bled moderately when touched. I extracted it, or the largest portion of it, with the forceps. Under the microscope, the growth exhibited a mixture of epithelial and fusiform or fibro-plastic cells. The epithelial cells were decidedly the most numerous. Some cholesterine was found. Vid. Fig. 11. The cells marked *a* were seen near the surface; the others were seen in the central portions, where the cholesterine was also found.

After the operation, the patient was directed to syringe her ear often enough to keep it clean, and to instil into the meatus daily an aqueous solution of iodine. Soon after this, she left the city, and I did not see her again. Her sister, who called upon me nearly two years later, told me, that, after using the iodine for a few weeks, the otorrhœa ceased. Local treatment was then discontinued, and the ear had since been well.

CASE 10. — *Encysted epithelial tumor of the left meatus, from which an epithelial polypus had been previously taken. Otorrhœa. Recovery.*

Miss L. A. B., an American, of good general health, light hair, eyes, and complexion, had scarlet fever when five years old. This was followed by otorrhœa from each ear, which continued with varying intensity, sometimes bloody and generally offensive, till I first saw her. She was then ten years old, and had consequently suffered from otorrhœa for five years. I found an epithelial growth in the right meatus, attached to its superior wall, and at about the middle of its length. The membrana tympani was perforated. The left meatus was in an unhealthy condition; its membrana tympani was perforated, and there was a copious otorrhœa, but no foreign growth. The ticking of my watch was heard about six inches from the right ear, and four inches from the left. I extracted the growth from the right meatus, directed a solution of acetas plumbi to be instilled into each ear daily, and advised syringing often enough to keep each meatus clean. Counter-irritation back of each ear was also employed. This treatment was followed in four weeks by a complete cessation of the discharge from each meatus. Her hearing, as tested by my watch, increased to a distance of more than three feet from each ear. In both ears, the walls of the meatus became white, and the ceruminous secretion appeared. The perforations remained.

This condition continued from September, 1851, to Decem-

ber, 1853, — a period of more than two years. At the end of that time a slight discharge, without apparent cause, started from the right ear. Two months after its appearance, she again came under my observation, when I found a small epithelial growth attached to the superior and anterior wall of the right meatus, near its orifice. This was extracted, and its root cauterized. A strong solution of lead was instilled into the meatus two or three times a day. In a couple of weeks, the otorrhœa ceased, and the meatus assumed a healthy aspect.

Somewhat more than a year later, a discharge again appeared from the right ear, unaccompanied with pain or tenderness. Three weeks after its appearance, she came to me again. I discovered an oblong, globular tumor in the right ear, attached by a narrow neck to the meatus, near the junction of the cartilaginous and bony portions. This was extracted with Mr. Toynbee's forceps. It proved to be a cyst, about half an inch long, containing reddish fluid. To the naked eye, the external surface of the growth appeared to be covered with a delicate epidermis. At the base was an opening about a line in diameter, communicating with a cavity lined with a pulpy, exceedingly friable, reddish membrane, presenting some yellow points. It was evidently a small encysted tumor. On microscopical examination, the external layer appeared to be composed of nucleated epithelium and free nuclei. The wall of the cavity was composed of epithelial cells, free nuclei, fibroplastic elements, fat, and cholesterine. Vid. Fig. 12 for the outer surface, Fig. 13 for the inner surface.

Immediately after the extraction of the tumor, the otorrhœa ceased. The hearing remained uninjured. Six years after this, — in July, 1860, — I had an opportunity of examining the ear. There had been no discharge. The walls of each meatus were white. The right membrana tympani presented a central perforation. Its remaining portion was opaque, and drawn

in, as if adherent to the opposite side of the cavity. Her hearing was quite good.

CASE 11. — *Encysted epithelial tumor of the right meatus. Otorrhæa. Extraction. Recovery. Deafness of the same ear.*

Mrs. W., an American, æt. 40, of good general health, with light hair, eyes, and complexion, applied for relief from deafness of her right ear. She reported that she had experienced some difficulty of hearing from that ear for several years. About a year previously she was attacked with pain in it, for which leeches were applied, and with relief. Soon after this her right ear began to discharge, and the otorrhœa continued up to the time of my seeing her. It had never been copious or bloody. At times the discharge would materially diminish and almost cease. At such times, she suffered from earache. No treatment, except occasional syringing, had ever been instituted.

On examination I found the left ear normal. The orifice of the right ear was moderately swollen, and somewhat tender. The meatus was plugged with a hard polypus, not bleeding or tender to the touch, and attached by a small pedicle to the posterior wall of the middle third of the meatus. The growth was easily extracted with a pair of forceps.

After extraction, it was found to be spherical in shape. It was of the size of a small pea, elastic, and had been attached by a narrow neck. It was slightly translucent, of a whitish color outside, and exhibited a reddish substance within. It proved to be a cyst, with walls about one sixteenth of an inch thick. The cavity was filled by a reddish fluid, containing blood-corpuscles, and epithelial cells, and nuclei in every stage of development. The walls of the cyst were composed of two distinct coats. The exterior was a thin and firm membrane, wholly made up of layers of nucleated epidermic cells, progressively increasing in size from the interior

to the outer surface. This membrane had the characters of epidermis. Its inner surface was smooth, and was lined by a less coherent membrane, consisting of young epithelial or epidermic cells in irregular layers. The inner surface of this membrane was ragged, and consisted of loosely cohering cells, which were generally small. The two coats of the cyst could be easily separated from each other. A few isolated, fibroplastic cells and fibres occurred; but no fibrous or other tissue than the epithelial was found in the tumor. The inner coat of the cyst was perhaps identical with the loose tissue formed of growing epidermic cells, which underlaid the cuticle, and from which it could be easily separated.

A slight bleeding followed the extraction of the tumor. The cut or torn surface was cauterized with the solid nitrate of silver. The otorrhœa ceased at once after the operation. No after treatment was required beyond one or two applications of caustic. Nine days after the operation, I examined the ear carefully. There was no appearance of the root of the cyst. The walls of the meatus were white. The membrana tympani was opaque. Before extracting the growth, she heard the ticking of my watch only when pressed on her right ear. The hearing was not improved after its extraction. Six months later, I heard from Mrs. W. There had been no return of otorrhœa, or disturbance in the ear, or improvement of hearing.

CASE 12. — *Epithelial polypus of the left meatus. Otorrhœa. Extraction. Recovery.*

Miss M. G., an American, æt. 12, with light hair, eyes, and complexion, and of average general health, suffered from infancy with occasional turns of otorrhœa from her left ear. These came on without apparent cause, and disappeared spontaneously. When about ten years old, there was an interval of a year without any otorrhœa. At the end of that

time her left ear began to discharge again, and continued to do so uninterruptedly for six months. She then applied to me for relief.

When I first saw her, the right ear was normal. The meatus of her left ear contained a small quantity of matter. Its walls were more or less denuded of epidermis. A growth, apparently pedunculated, firm to the touch, not tender or bleeding easily, was attached to the anterior wall of the meatus, near the junction of its bony and cartilaginous portions. A portion of the membrana tympani only was visible; so that its condition could not be ascertained. Her tonsils and cervical glands were slightly enlarged. The fauces were healthy. She heard the ticking of my watch six or eight feet from her right ear, and only three or four inches from her left one. A solution of the acetate of lead, of the strength of eight grains to an ounce of water, was instilled into the left meatus three times a day, for three days. At the end of that time I extracted the growth.

After extraction, it was found to be globular, about one quarter of an inch long, a line or more in diameter, and attached by a pedicle. It was a highly vascular growth, characterized under the microscope by a large number of granular cells and no fibrous tissue. A marked peculiarity was the quantity of blood it contained. The degeneration of the cells, shown by their highly granular character, obscured any peculiar features.

After the removal of the polypus, the whole membrana tympani could be seen. There was no perforation, and only slight opacity. The walls of the meatus were irritated and red. A blister was ordered back of the ear. A lead solution, of four grains to an ounce of water, was prescribed for instillation five or six times daily into the meatus. At the same time, Blanchard's pills of the iodide of iron were given internally. The blister back of the ear was repeated once or twice. The

strength of the astringent solution was gradually increased to eight grains to an ounce. In the course of a fortnight, this was changed to a solution of alum, of the strength of ten grains to an ounce, which was poured into the ear, at first four times a day, and afterwards only twice a day. Under this treatment, the congestion of the meatus gradually faded away, and the discharge ceased.

Six weeks after the operation, I examined the ear. The walls of the meatus were white. There was a normal secretion of wax, and there was no otorrhœa. She heard the ticking of my watch four feet from her left ear. Four months later, this improved condition was maintained. She was apparently well.

ANALYSIS OF THE PRECEDING CASES.

The points of especial interest which these twelve cases exhibit are presented in the accompanying table. It is a summary of the record of thirteen foreign growths of the ear. Two of these, occurring in the same individual, are recorded in the second case. The table, therefore, exhibits the history of thirteen foreign growths, taken from a record of twelve cases. One or two other foreign growths are mentioned in the account of the cases; but, as no microscopic examination of them was made, they are not included in the table.

It is evident from inspection that this table is arranged for the purpose of exhibiting the following particulars:—

1st. The sex, age, and general health of the patients. 2d. The frequency with which one or both ears were affected, and the earliest symptoms noticed. 3d. The character of the growths, such as their shape, size, point of attachment, and intimate structure. 4th. The condition of the meatus and membrana tympani before the commencement and after the cessation of treatment. 5th. The result of treatment upon the polypi. 6th. The result of treatment on the hearing. 7th. The kind and duration of the treatment. Each of these points deserves consideration.

1st. The sex, age, and general health of the patients.

It appears from the record, that, of thirteen growths, seven occurred in females and six in males, or nearly an equal proportion in the two sexes. Hence we may infer, or at least suspect, that sex does not exert any marked influence on the

No.	Sex.	Age.	General Health.	Ear affected.	First Symptoms, affect- ed.	Shape and size of growth.	Point of attachment.	Microscopic character.	Meatus and membrana tympani before treatment.	Meatus and membrana tympani after treatment.	Treatment adopted.	Duration of treatment.	Result as to polypos.	Hearing by the watch before treatment.	Hearing by the watch after treatment.
1. S. P. (case 1)	Female.	30.	Good.	Left.	1st, tinnitus; 2d, otorrhea; 3d, otalgia and tenderness. The first two had existed five months.	Oblong; $\frac{3}{4}$ inch by $\frac{1}{4}$ inch; pediculated.	Meatus; near membrana tympani.	Fibro-plastic; small granular bodies.	Swollen; tender; obstructed.	White; dry; diameter normal; membrana tympani opaque.	Extraction; cauterization; blisters; astrigent washes; syringing.	7 weeks.	Radical cure.	On the ear.	2 feet.
2. E. B. (case 2)	Male.	4 $\frac{1}{2}$.	Good.	Right.	Otorrhea and otalgia. Existed several weeks.	Oblong; pediculated; $\frac{1}{2}$ by $\frac{1}{4}$ inch.	Cartilaginous meatus.	Fibrous; fusiform cells.	Moderately tender; discharging.	Reddened; membrana tympani opaque.	Extraction; astringents; syringing.	8 days.	Radical cure.	Too young to ascertain.	Too young to ascertain.
3. E. B. (case 2)	Male.	7 $\frac{1}{2}$.	Good.	Right.	Otorrhea; occasional otalgia. Existed 3 to 4 years.	Globular; broad base; size of grain of maize.	Wall of meatus.	Epithelial; fibroid tissue; nuclei; cells.	Slightly swollen; red; membrana tympani perforated.	Narrowed; red; discharging; membrana tympani perforated.	Extraction; syringing; astringents.	4 years.	Radical cure.	A few inches.	A few inches.
4. C. A. (case 3)	Male.	10.	Delicate.	Right.	Otorrhea after measles. Existed 6 years.	Oblong; pediculated; $\frac{1}{2}$ inch long.	Upper wall of meatus; cartilaginous portion.	Fibro-fusiform and ovoid cells.	Congested; discharging.	No record.	Extraction; syringing; caustic; astringents.	No record.	No record; probable radical cure.	Not heard on the ear.	Not ascertained.
5. T. B. (case 4)	Male.	25.	Good.	Left.	Otorrhea. Existed 14 years; cause unknown.	Pyriform; $\frac{5}{8}$ in. long, $\frac{3}{4}$ inch at widest part; broad base.	Upper wall of meatus; near membrana tympani.	Fibro-plastic; ovoid cells.	Red and rough; discharging; membrana tympani destroyed.	White and dry.	Extraction; syringing; solutions of lead, alum, iodine & nit. argent.; cauterization.	7 weeks.	Radical cure.	3 inches.	12 inch.
6. H. (case 5)	Female.	23.	Good.	Left.	Otorrhea, following scarlatina. Existed 18 years.	Pediculated; size of grain of maize.	Meatus; near orifice.	Epithelial; nuclei and cells, with fibroid tissue.	Red; granular; discharging; membrana tympani perforated.	Smooth; slight irritation, kept up by discharge from cavitas tympani.	Extraction; caustic; syringing; astringents.	12 days.	Radical cure.	2 inches.	A few inches.

7. B. C. W. B. (case 6)	Male.	45.	Good.	Left.	Otalgia; swelling; otorrhea. Existed 4 weeks	Globular; with broad base; $\frac{1}{4}$ inch by $\frac{1}{4}$ inch.	Meatus; near orifice.	Epithelial; with a little fibrous structure.	Red; swollen; tender; painful.	White and clear; slight opacity of membrana tympani.	Extraction; leeches; caustic; syringing.	4 weeks.	Radical cure.	On the ear.	2 or 3 feet.
8. H. G. H. (case 7)	Male.	35.	Good.	Left.	Otalgia; otorrhea. Existed several years.	Oblong; 1 inch by $\frac{1}{4}$ inch; broad base.	Wall of meatus.	Fibroplastic; nuclei and nucleoli.	Irritated and discharging; perforation of membrana tympani.	White and dry; perforation of membrana tympani as before.	Extraction; caustic; astringents; syringing.	13 w'ks.	Radical cure.	Not at all.	Not at all.
9. P. P. (case 8)	Female.	18.	Good.	Left.	Otorrhea after scarlatina. Existed 12 years.	Globular; pediculated; size of grain of maize.	Meatus; near membrana tympani.	Epithelial; cells and nuclei.	Without tenderness or swelling; perforation of membrana tympani.	White and dry; perforation; astringents as before.	Astringents; iodine; syringing; extraction.	16 w'ks.	Radical cure.	On the ear.	On the ear.
10. W. W. (case 9)	Female.	16.	Delicate.	Left.	Otorrhea. Existed 5 months.	Globular; size of grain of maize.	Meatus; near orifice.	Epithelial; with fibroid tissue; cholesteroline.	Slightly irritated.	White and clear.	Iodine; syringing; extraction.	4 weeks.	Radical cure.	On the ear.	Normal.
11. A. B. L. A. B. (case 10)	Female.	13.	Good.	Right.	Otorrhea after scarlatina, with epithelial growths. Existed at intervals for 9 years.	Oblong; pediculated; small.	Meatus; near middle of its length.	Epithelial; cholesteroline.	Irritated; red; membrana tympani perforated.	White and dry; no discharge.	Extraction;	1 day.	Radical cure.	3 feet.	3 feet.
12. W. W. (case 11)	Female.	40.	Good.	Right.	Otalgia; otorrhea. Existed 12 months.	Spherical cyst; size of a pea; pediculated.	Meatus; on its middle third.	Epithelial; with some fibrous tissue.	Swollen and tender; discharging.	White and clear; membrana tympani opaque.	Extraction; caustic.	3 days.	Radical cure.	On the ear.	On the ear.
13. M. G. (case 12)	Female.	12.	Good.	Left.	Otorrhea. Existed six months.	Oblong; 1 inch long; $\frac{1}{4}$ inch wide; pediculated.	Meatus; on its middle third.	Epithelial; with granular matter.	Red and irritated; discharging.	White and clear; slight opacity of membrana tympani.	Extraction; astringents; blisters; iron; syringing.	6 weeks.	Radical cure.	$\frac{1}{4}$ inches.	4 feet.

production of these growths. Such, I believe, is the general opinion of aurists.

An examination of the ages of the patients shows that the youngest was four and a half, and the eldest forty-five. Their average age was a little more than twenty-one years. Hence it would seem as if difference of age had as little influence as difference of sex in the causation of polypi, — as if adult life were as liable to them as childhood. Still, it is my impression, notwithstanding these figures, that aural polypi are more likely to occur in childhood than later in life. The above cases are not enough to decide this point. They only make it clear that no age is exempt from them.

As to the matter of general health, or constitutional condition, most of these patients were in sufficiently good case. Eleven reported their general health to be good. Two called it delicate. This would go to show that the general condition of the system, in these cases, was not of etiological importance so far as the growths were concerned. The truth probably is, that neither the sex, age, nor general health of the individuals whose cases we have considered had much to do with the polypi in their ears. The growths sprung up in consequence of local causes, and grew because they found an appropriate soil. The general condition of the system may have exerted an indirect influence in preparing the soil for them, and in keeping it in a state favorable for their nourishment. Beyond this, and this is a good deal, the general health of these patients had very little influence over the polypi. I shall have occasion to allude to this subject in another place.

2d. The frequency with which one or both ears were affected, and the earliest symptoms noticed.

We gather from the table that eight of the thirteen growths appeared in the left ear, and five in the right ear. It is not fair to infer from this that the left ear is more likely to give birth to polypi than the right one. It would require a very

large number of cases to justify any such conclusion. It is probable that they may occur indifferently in either ear. Such, I think, is the common opinion of observers.

The inquiry as to what were the earliest symptoms is an important one. We learn from the table, that, in one instance, tinnitus aurium was among the earliest symptoms noticed. In six cases, otalgia appeared early. In two or three cases, tenderness and swelling were mentioned as among the first indications of difficulty. *In all of them*, otorrhœa was referred to as appearing *early*. Whatever else existed, — pain, tenderness, swelling, or noises, — a discharge from the ear was always one of the first warnings, and sometimes the first and only warning, of impending or existing evil. It is true that in none of these cases was the meatus examined when the otorrhœa was first noticed, and therefore I cannot state from personal inspection that the growth did not precede the discharge and the other symptoms. But it is highly improbable that such was the fact. If it had been, the growths in some of these cases must have existed several weeks, and in others many years, before any application for relief was made. During this length of time, they would have attained a size, or have induced inconveniences, that would have compelled the sufferer to seek advice and relief. The inference is conclusive that the otorrhœa preceded the polypus, and not the polypus the otorrhœa.

The opinion of aurists, from which, I think, Kramer alone dissents, and which these cases confirm, is that a condition of the meatus producing otorrhœa is the common antecedent of polypus. Triquet says: “Fungoid excrescences or polypi of the ear are developed almost always — I dare not yet say always — after chronic suppuration of the auditory apparatus. Such suppuration occurs most frequently after acute or chronic catarrh either of the external or middle ear. The dissections which I have made demonstrate that it is principally after chronic otitis that polypi spring up; and that such otitis is due to a sponta-

neous inflammation of the external or middle ear, or that it arises during the course of an exanthem or of some grave fever." *

Similar views are expressed by Bonnafont, Wilde, Von Tröltsch, Toynbee, and others. The chief practical value of this fact is, that it is an additional reason why a discharge from the ear should be examined and treated as soon as it appears. The condition of the meatus which produces a discharge from it, and which may lead to a growth in it, can generally be brought back to a healthy state with care, if treatment is adopted as soon as there is any otorrhœa. The longer treatment is deferred, the worse for the patient. If it is deferred till a polypus springs up, years may be required to eradicate an evil that a few weeks would have relieved at an earlier period.

3d. The character of the growths. — such as their shape, size, point of attachment, and intimate structure.

In shape and size they were so various that no two of them could be said to be alike. Some were oblong, and others globular; some were pyriform, and some pediculated. Some of them were attached by a broad surface, and others by a narrow neck. The largest were an inch long, and half an inch in diameter; the smallest were not a quarter of that size. It would be difficult to arrange them under any classification based upon their shape and size. With some aid from the imagination, they might be put into separate classes, and called globular, pyriform, and the like. I do not see the advantage, however, to be derived from such a classification. It does not add to our knowledge, nor aid our treatment. In color, they bore a general resemblance to one another. They were all red, but they presented varying shades of redness. Some were pale red; others had a deep raspberry hue. Some of them had a delicate covering, and presented a smooth external sur-

* *Traité Pratique des Maladies de l'Oreille*, par E. H. Triquet, p. 354.

face ; others were rough on the exterior, and looked like an aggregate of granules.

These growths were attached to various parts of the external meatus ; more of them to the middle than to any other portion. The auditory meatus of the adult is about one and a quarter inches long. Suppose this, for convenience, were divided into three equal parts, called the outer, middle, and inner thirds. Following this subdivision, we find that three of these growths were attached to the outer third ; five of them to the middle third ; three of them to the inner third ; and that of two of them the attachment was not made out, or was not recorded. This does not bear out Mr. Wilde's statement, that "in eight cases out of a dozen these polypi sprout from the site of the ceruminous glands in the posterior wall of the meatus."* It is possible, however, that Mr. Wilde may be correct, and that a larger number of observations than the above would show such to be the case. I have seen polypi growing from the membrana tympani and from the cavity of the tympanum, and have extracted them from both of these places.

An examination of the intimate structure of these growths shows that they belong to two distinct groups. They were either epithelial or fibrous in their character.

Those which belonged to the fibrous group presented the following characteristics. They were not invested by a distinct membrane, but covered with a sort of pavement epithelium, as seen in Fig. 1. Internally, their color, when not reddened by infiltrated blood, was of a pale pink, or almost of a grayish white. Their general appearance was homogeneous. Under the microscope, some of them exhibited fine parallel fibres, as shown in Fig. 2. Others a delicate fibrous structure, in which were numerous minute globules or granules, as in Fig. 6. Spindle-shaped or fusiform cells, as seen in Figs. 3 and 4, with free nuclei and smaller nucleoli, as in Fig. 9,

* Aural Surgery, by W. R. Wilde, p. 416, Eng. ed.

abounded in all of them. Whatever else they contained, the predominating elements were those of fibrous tissue in process of development or fully developed; resembling what Lebert has figured under the head of a fibro-plastic growth. Epithelial cells were often found in these specimens, but not in large numbers. The predominating elements were fibro-plastic. The individuals of this group were, in reality, small fibrous tumors. Their appropriate designation is that of fibrous polypi of the ear.

They are evidently the same as those which Mr. Toynbee has described under the name of fibro-gelatinous polypi. In his description of them he says:—

“The surface of this polypus is smooth, and is constituted of a layer of about a quarter of a line thick, which may be separated from it by maceration, and which consists of cells bearing every resemblance to those of the epithelium, covering the buccal mucous membrane. This epithelial layer is as thick and white as ordinary writing-paper; and when detached and floating about, it retains the shape of the polypus of which it had formed the surface. The interior of the gelatinous polypus is composed of corpuscles and fibrous tissue, varying in proportion in different specimens, but *the fibrous tissue generally predominates*. The corpuscles have a rounded form, but vary in size and shape. In a specimen which was a fair example of this kind of polypus, as it comes under the notice of the surgeon (it being white and soft, and readily compressible by the thumb and finger), I found these cells, varied in shape from a perfect round to an irregular oval, and in size from that of a blood-corpuscle to a half or a quarter of its dimensions,—the greater number appearing certainly smaller than the blood-disk; but they presented every variety of size between that disk and a fine granule; and there was very little symmetry in form or size, even between those which were nearest to each other. These cells are not generally in close

contact, but are separated by a delicate gelatinous substance, which is sometimes quite transparent and structureless, and occasionally so abundant as to form by far the largest portion of the mass. In parts where the polypus is resisting, these cells are separated by delicate wavy bands, having the appearance of fibres; and to the surface of these fibres the cells are observed to adhere. In some parts, these wavy, gelatinous-looking fibres *form almost the entire substance of the polypus*, the rounded cells being scattered very sparingly; in others, these fibres are absent. The wavy fibres run in the long diameter of the polypus, possess considerable toughness; and although easily separated from each other, and isolated, they cannot be torn across without considerable force. In some instances, these fibres are extremely firm, and the *polypus is entirely composed of them*, so as to become solid and very hard. When separated from each other, they wear the appearance of transparent lines, whose diameter varies from half to a quarter of that of the blood-disk. Interspersed through the substance of the polypus were many spindle-shaped crystals.*

This description corresponds, in all essential points, with the previous observations on what I have called fibrous polypi. It is not important whether such growths are called fibrous or fibro-gelatinous; but it is simpler to use the fewest words. Moreover, the term "gelatinous" is not strictly correct, for the gelatinous appearance or substance is not always present in these tumors.

The second group consisted of epithelial growths. These had a semi-gelatinous appearance, and were softer to the touch than the others. They were friable, and crushed easily between the thumb and finger. Several of them had a distinct investing membrane, sometimes composed of nucleated epithelium, as seen in Fig. 8 and in Fig. 12, and sometimes of

* Diseases of the Ear, by Joseph Toynbee, F. R. S., pp. 123, 124, Am. ed.

a granular amorphous substance. Others of them presented no external covering. Internally they contained small epithelial cells, with nuclei and small nucleoli, sometimes isolated, and sometimes crowded together. Occasionally, there was some mixture of fibrous tissue with the epithelial cells, as seen in Fig. 7. Now and then cholesterine was intermingled with the fibrous and epithelial elements, as in Fig. 11 and in Fig. 13. In some of them no fibrous tissue whatever could be discovered. Blood-vessels, and ordinary areolar tissue, were not discovered in any of them. Two of these growths proved to be cysts, whose walls were composed of two coats, an external and an internal one. These coats, however, consisted of epidermic or epithelial cells in irregular layers. The elements of the external coat of one of these cysts are represented in Fig. 12; of the internal coat, in Fig. 13. The interior of the two cysts was filled with blood-corpuscles, epithelial cells and nuclei, variously developed. These encysted tumors, in reality, differed from the rest of the group only in form. They were distinctly epithelial or epidermic. In all of the individuals of this group, the predominating elements were epithelial. Fibrous tissue was sometimes seen interspersed among the other elements, but not in sufficient quantity to be of importance. These growths were as decidedly epithelial in character as those of the former group were fibro-plastic. Their appropriate designation is that of epithelial polypi of the ear.

Dr. Bennett, in his clinical lectures, has given a description of fibro-plastic and epithelial growths in general, which applies with great accuracy to those described above as fibrous epithelial polypi. It is interesting to compare his account with these observations.

Speaking of fibro-plastic growths, he says: "These tumors are generally of a white color, more or less tough and elastic, resembling the well-known structure of the dermis. This,

indeed, is not so apparent in examining the comparatively thin human dermis; but on looking at that of some of the larger animals, and more especially of the whale, the analogy in structure at once becomes evident. These tumors are of a rounded or oval form, frequently embedded in a cyst composed of the indurated structures in which they lie. They are of considerable density, varying from that of a tendon to that of a ligament or fibro-cartilage, and, on section, present numerous white, glistening fibres, intimately interwoven together, or arranged in bundles, constituting circles or loops, intercrossing with each other. Occasionally they have a calcareous centre or nucleus. Their color is generally white, but sometimes they have a yellowish tinge. They are for the most part not very vascular, although there is a great difference in this respect; some approaching the pinkish color of sarcomatous growths, and others being of a dead-white, and of extreme density, containing scarcely any vessels. They vary greatly in size, from that of a pin's head to a volume measuring several feet in circumference. . . . The minute structure of these dermoid tumors is found to consist of fusi-form cells, more or less aggregated together. In the softer portions of the growth, they can be easily separated by needles; but in the indurated portions they are so dense that this is impossible. Sometimes the filaments are more or less waved, as in ordinary fibrous tissue; at others, they are curled and brittle, as in elastic tissue." *

Again, when describing epithelial growths, Dr. Bennett says, in the work just quoted, that "the epidermic and epithelial cells are continually thrown off from the skin and mucous membranes, and new ones are as constantly formed. Numerous circumstances may arise which induce their production in greater numbers, or their accumulation in particular parts. In

* Clinical Lectures on the Principles and Practice of Medicine, by John Hughs Bennett, p. 210, Am. ed.

this case they may soften and give a morbid character to fluids, as that of the urine ; or they may become indurated, causing thickenings or swellings on the mucous surfaces, — callosities or tumors of the skin. Structures composed of epidermic growths, as hair or horn, may become excessive, or arise in parts which are unusual. Lebert was the first to point out that many of the tumors, hitherto called cystic, fibrous, and even cancerous, may belong to this class of growths. In all cases they consist of an increased number of epidermic or epithelial cells, more or less compressed together, frequently united by filaments of fibrous tissue, and supplied by blood-vessels.”

A comparison of this description of epidermic and fibrous tumors with the account given of the minute structure of the tumors of the preceding cases, and with the appearances in the accompanying plates, will show the similarity of the two. In fact, all non-malignant growths of the ear may be resolved into epithelial or fibrous polypi. Except in shape and size and certain unimportant matters, they do not differ from similar tumors in other parts of the body.

The situation of aural polypi enables them to be more easily seen than polypi of the nose, or of the uterus, or larynx. Their progress can also be observed with greater accuracy than that of the latter, and the condition of the tissues from which they spring can be more readily appreciated. It may, therefore, be reasonably expected that a careful and exact study of the causes and progress of epithelial and fibro-plastic growths of the ear, where they can be easily observed, would throw some light upon the causes and progress of similar growths in situations where they cannot be so easily approached and studied.

4th. The condition of the meatus (and of the membrana tympani) before the commencement and after the cessation of treatment.

By reference to the table, or to the cases themselves, we

learn that in every instance the meatus was either seriously diseased, or bore the evidence of previous serious disease when the patient applied for relief. In a single instance, Case 8 (No. 9 of the table), the meatus was free from redness and tenderness. But in this case the membrana tympani was so largely perforated as to be nearly destroyed, and thus exhibited conclusive evidence of antecedent grave disease. In all the other cases, the meatus was more or less swollen, red, and irritated. In a few instances the tenderness was excessive. Swelling existed in nearly every case, and was sometimes present in such a degree as to prevent any satisfactory examination of the passage. Whenever there was pain, it was commonly of a sub-acute and uneasy character; once or twice only was it acute. Otorrhœa was a constant symptom. The discharge flowed from the polypus, or from the neighboring tissues, or from both. The membrana tympani was perforated in seven instances; in five, it was whole, but in those it was opaque. In one instance the condition of the membrane was not recorded. Occasionally granulations were seen through the perforation, within the cavity of the tympanum. In a few cases the walls of the meatus exhibited them also. The auricle was generally healthy. The integuments around the ear were frequently swollen. The swelling sometimes extended quite a distance back of the ear and over the mastoid process.

It was impossible to ascertain, by any examination, whether the perforations of the membrana tympani which are recorded were produced before or after the growths appeared. It can scarcely be doubted, however, that the polypi sprung up after the membrane had been perforated, and that, consequently, they had no influence in causing perforation. On the contrary, it is not impossible that the affection which perforated the membrane of the tympanum had a direct or indirect influence in the causation of the polypi.

It is apparent from these facts that the above polypoid

growths of the ear followed some antecedent disease. This antecedent disease was characterized by the usual symptoms of inflammation, viz. redness, swelling, tenderness, and pain; to which should be added the constant presence of a discharge. Hence, it is fair to infer that the remote or predisposing cause of these growths, and possibly, in some instances, their immediate or exciting cause, was inflammation.

Let us now compare the condition of the meatus and membrana tympani at the close of treatment, when the polypi had been eradicated, with the condition of the same parts before it was commenced. We have already dwelt sufficiently upon the morbid condition which preceded and accompanied the polypi. It appears that when these growths had been removed, and the tissues had reached as healthy a state as they were capable of attaining, they did not return to a normal appearance. None of the perforations of the membrana tympani were healed. There remained seven perforations, — the number which previously existed. In those cases in which the membrane was not perforated, it remained more or less opaque.

The meatus exhibited traces of disease as well as the membrana tympani. In most of the above cases, the meatus was considerably narrowed. Its diameter was diminished. In nine instances the walls of the meatus, whether narrowed or not, were white and dry. In three, they were permanently reddened. The redness was in lines. It presented a striated appearance. The smooth, clear, and *living* look of the ear-passage had departed. This had been exchanged for an aspect of what I cannot describe by any better term than deadness. The footstep of disease was there. When the membrana tympani had been completely destroyed, so that the cavity of the tympanum was freely opened into the meatus, and could be readily inspected, it was found that equally important changes had been wrought in the middle ear. In

some cases the ossicula, with the exception of the stapes, had been destroyed. The mucous membrane of the cavity was generally thickened. In a few instances the surface of the interior, as far as it was visible, presented an irregular and rough aspect. In two or three this surface was white, as if a false membrane had grown over the mucous membrane, or as if the mucous surface had been changed into a cartilaginous one.

A discharge from the ear occurred in all of the preceding cases, while the growth was in the ear. After its extraction, the otorrhœa ceased in all but two cases. In these two there was perforation of the membrana tympani, and the discharge which continued at the close of treatment was simply of a mucous character, proceeding from the cavity of the tympanum. An otorrhœa, which attends a polypoid growth, is so generally kept up by the latter, that it is reasonable to expect the cessation of the one, after the successful and radical extirpation of the other.

5th. The next point is the result of treatment upon the growths.

So far as the polypus was concerned, this was most satisfactory in all of the previous cases. In all of them the polypus was so completely eradicated that it did not return. It is true, that, in some of them, years were necessary in order to attain this result; yet it was finally attained. This accords with my general experience. I do not remember a single case that has come under my observation, in which a similar satisfactory result has not been reached, except when the perseverance of the patient has failed, and treatment been renounced, before a radical cure could be effected.

6th. The result of treatment on the hearing.

The effect of treatment on the hearing was not so satisfactory as it was on the polypi. If we turn to the record, we find that in seven of the previous thirteen cases the hear-

ing distance, as tested by a watch, was the same at the conclusion of treatment as at its commencement. The hearing was not improved by removing the growth. In the remaining six cases the hearing was improved. In one instance a watch which was heard only by pressing it on the ear, before the growth was taken out of the meatus, was heard normally at the close of treatment. So good a result as this is not usually attained. In five cases there was an improvement varying in amount from a few inches to four feet. It appears, then, that in rather more than half of these cases the hearing was not improved by removal of the growth; and that in rather less than half of them it was more or less improved. This is what a careful observation would lead us to anticipate. So far as a polypus is a mechanical obstruction to the hearing, filling up the meatus as wax does, its removal will improve the hearing. But in many cases, I presume in most, the hearing is defective on account of the condition of the tissues that leads to the production of a polypus. The removal of the latter takes away a mechanical obstruction, but does not restore the neighboring parts to a healthy state. Moreover, a disorganized tympanum frequently attends or precedes a polypus, and, of course, exerts a marked influence on the hearing. Hence it is apparent, that, in giving a favorable prognosis to a patient with polypus of the ear, the surgeon should remind him that the polypus alone is referred to, and that, though his hearing may be improved by treatment, it will not necessarily be so. If the tympanum is sound when a polypus is present in the meatus, there is great reason to hope that the extirpation of the growth, should there be any deafness, will restore the hearing.

7th. The kind and duration of treatment.

In all cases an efficient local treatment was employed. Occasionally constitutional measures were found necessary. In some of them, perhaps in the larger number, the former alone proved to be sufficient. The local treatment consisted of ex-

traction, cauterization, and occasional counter-irritation, besides the use of astringents, syringing, and sometimes of leeches. The constitutional treatment consisted chiefly of hygienic measures, and tonics, — especially iron. The iodide of potassium was used several times. The details of treatment will be given in another place.

The duration of the treatment was recorded in twelve of the preceding thirteen cases. In one of these, Case 11, where no treatment except extraction of the polypus was requisite, the duration is put down as one day. The longest course of treatment, that of Case 3, was four years. The average duration was twenty-two and a half weeks, or nearly six months. By the duration of treatment, I mean not only the time occupied in the extraction or destruction of the polypus, but also that occupied in leading the tissues into such a condition that there was no danger of its reproduction. It appears from the preceding observations that this cannot be done at once. The extraction of a growth is generally an easy matter. It is not so easy a matter to prevent its return. In a number of these cases, the patience, ingenuity, and perseverance, both of myself and of the patient, were severely taxed before a satisfactory result was reached.

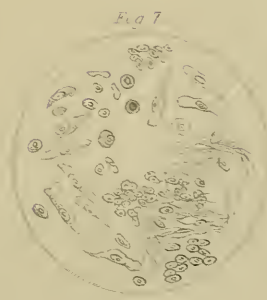
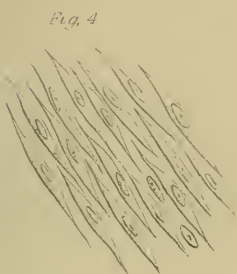
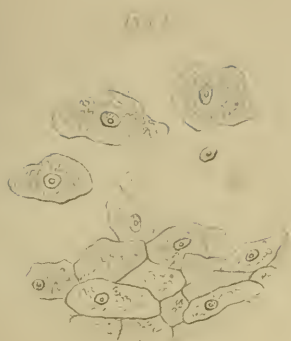


Fig. 9

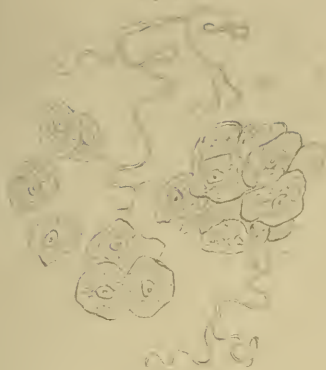


Fig. 10

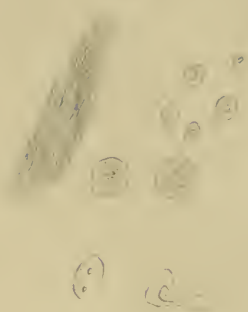


Fig. 11

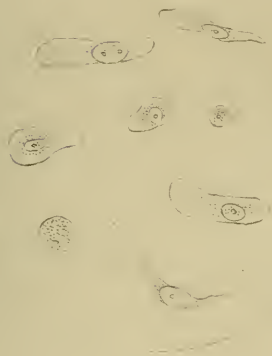
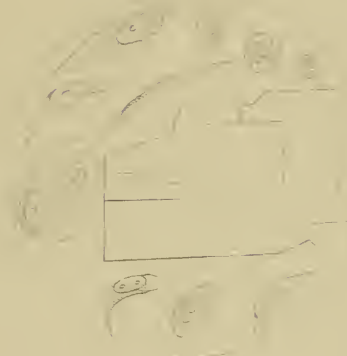


Fig. 12



a

Fig. 13

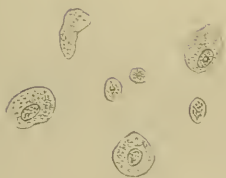


Fig. 14



PART SECOND.

DESCRIPTION OF POLYPOID GROWTHS OF THE EAR AND OF THEIR TREATMENT, BASED CHIEFLY ON THE PRECEDING CASES.

MORBID growths in the ear-passages, to which the name polypus is commonly given, are of frequent occurrence. They may be found in both sexes and at all ages. They vary in shape, size, color, position, and structure. They are both the result and the cause of disease in the ear. Sometimes they nearly destroy the power of hearing; and sometimes they only impair it. When removed, they are apt to grow again, and are eradicated with difficulty. A careful examination of their structure shows that they may be naturally divided into two varieties, or classes, viz. Fibro-plastic Polypi, and Epithelial Polypi. Both of these possess peculiar characteristics.

FIBRO-PLASTIC POLYPI.

FIBRO-PLASTIC polypi have generally a smooth external surface. While in the ear, they present a red or light red appearance, but when removed from it they are of a pale pink, and sometimes of a grayish white color. They are firm to the touch, and are not easily crushed between the thumb and finger. When touched or pressed in the meatus by a probe, they are slightly sensitive, and rarely bleed largely. In size they vary from that of half a pea to that of a body an inch or an

inch and a quarter long, and nearly half an inch in diameter. Their shape is as various as their size. Most commonly, however, they are globular or pyriform. They grow from the fibrous tissues of the ear, and consequently may be found attached to any part of the walls of the external meatus, or to the membrana tympani. They rarely spring from the cavity of the tympanum. The outer half of the meatus appears to generate them more readily than its more deeply seated portions. They are apt to be attached by a pedicle or narrow neck to whatever part they grow from; yet they are occasionally seated, with a broad base, upon their parent soil. After extraction from the meatus they collapse slightly. The surface from which they are removed never bleeds freely, in consequence of the operation of removal, though some blood, of course, drains from it. Whatever pain accompanies the operation — and it is never severe — results mostly from adjusting the instrument in the meatus, and not from excising or extracting the tumor.

As to their intimate structure, fibro-plastic polypi are not usually invested by any distinct membrane, but are covered by a kind of pavement epithelium. They consist of indistinct fibrous tissue, and exhibit bundles of fine parallel fibres, as seen in Fig. 2, and groups of nucleated fibres and nuclei, as in Fig. 3 and Fig. 4, — such as precede the formation of fibrous tissue. Epithelial cells are often found interspersed with the above, but the predominating elements are fibro-plastic. A more complete account of the structure of this variety of polypi would only be a repetition of observations in the first part of this paper, to which the reader is referred.

EPITHELIAL POLYPI.

The second group, or Epithelial Polypi, may be found, like the first group, in any part of the meatus. They are highly

vascular, and consequently present a bright red or scarlet color to the eye. They frequently have a granulated appearance, resembling a raspberry thrust into or growing from the meatus. They are not firm to the touch, and often bleed spontaneously, or when felt of by an instrument. They collapse after extraction, and are easily crushed by pressure. After an operation the surface from which they are taken bleeds freely, but not dangerously. Their shape and size are irregular. They may be long and smooth; or lobular, with deep furrows or sulci in them; or with projections like arms; or of the shape of an irregular globular mass, varying in size from a pea to a raspberry, or larger. They grow from the epithelial tissues of the ear, and therefore may be found wherever these tissues exist. They frequently start up from the sides or bottom of a sinus or cul-de-sac, which has been eaten by ulceration into the walls of the meatus. They may spring from the mucous membrane of the cavity of the tympanum, from the mastoid cells, or from the epidermal lamina of the membrana tympani.

As to their intricate structure they consist chiefly, and sometimes altogether, of epithelial elements, more or less crowded together, and in various stages of development. While growing they may receive additions from the neighboring fibrous tissues, and exhibit traces of the latter in their structure. The predominating characteristics, however, are epithelial. Some of the individuals of this group are covered by a distinct investing membrane, which is also composed of epithelial tissue. Others have no investment. The cysts which are occasionally found in the ear belong to this variety. The microscopic characters of epithelial polypi, upon which this description is founded, have been previously given, and it is unnecessary to repeat them here.

In many cases it is not difficult to distinguish fibrous from epithelial polypi by their gross appearances alone. But this is

not always possible. When there is doubt, the microscope must be called in to solve the problem. As a general rule, fibrous polypi are firmer to the touch than epithelial ones. They are less likely to bleed when touched or moved by a probe, and they are less sensitive. They can also be removed with greater ease, by a single operation, than those of an epithelial structure. Their compact and dense character renders them less likely to break up under the grip of a pair of forceps, or to be torn apart by the loop of a wire snare, than an epithelial tissue. But these differences do not always exist. I have seen fibro-plastic polypi that bled on the slightest touch; and epithelial ones that could be moved in any direction without bleeding.

PROPERTIES COMMON TO EPITHELIAL AND FIBROUS POLYPI.

Although fibro-plastic and epithelial polypi of the ear present certain characteristic differences, which naturally separate them from each other, they are alike in this;— that they are the result of some antecedent morbid process in the tissues from which they spring. They are a morbid product rather than anything else. Precisely what the process is which finally evolves a polypus cannot be definitely stated, but it undoubtedly partakes of the nature of inflammation. It would not be irrational to explain it in some such way as the following.

Anatomists tell us that the external auditory meatus consists of two portions, an osseous and a membranous portion. The membranous meatus is composed of three laminae, called epidermis, dermis, and periosteum. Besides these laminae, fibro-cartilage and fibrous tissue are found in the meatus. Here are all the materials for the production of these growths. Suppose, now, that in consequence of exposure to cold, or of the peculiar derangement induced by measles or scarlatina, or of some injury to the parts, or of the presence of some foreign

substance, such as wax or exfoliated epithelium or other matter in the meatus, an inflammation of one or more of the tissues of the ear is set up. This inflammation may be acute, and consequently painful; or sub-acute, and so little painful as not to attract the attention of the patient. In the great majority of cases, such an inflammation would subside of itself, and leave few if any ill effects behind it. Unfortunately this is not always the case. When it does not subside spontaneously, it is apt to lead to a perverted nutrition of the affected tissues. If it attacks principally the dermoid layer of the meatus or the mucous membrane of the cavity of the tympanum, there will be an increased metamorphic change in those parts, — epidermic or epithelial cells will be produced and thrown off there in greater numbers than usual. At length, in consequence of this increased production, certain points become indurated. Here would be the germ or starting-point of a polypus. It would almost necessarily resemble the tissue from which it sprung. After it was fairly started it would seem to grow of itself, preserving a sort of independent existence. In like manner an inflammation which attacked the fibrous tissues rather than the mucous membrane, and which did not readily disappear, would induce an increased metamorphic change in those tissues. Hence there would be a greater production of fibro-plastic cells. A variety of causes would determine their accumulation in a certain locality. This accumulation would go on, and at length develop itself into a fibrous polypus. If the initial inflammation affected about equally the epithelial and the fibrous tissues, and germinated a polypus, the growth would probably partake both of the character of an epithelial and of a fibrous tumor. In this way we may account for the intermingling of fibro-plastic and epithelial elements in the same growth; such as we have seen to occur in several of the previous cases. This, however, does not invalidate the general rule, that polypoid

growths of the ear are either decidedly epithelial in their character, or fibro-plastic.

Acute inflammation is less likely than that of a sub-acute or latent character to favor the production of polypi. Hence the importance of recognizing these latter forms of inflammation of the ear-passages in their inception, and of using all the resources of medical art to guide them to resolution. They are the forms of inflammation which are most likely to be neglected by the patient, and overlooked by the physician. The fact that they do not always terminate in polypoid growths is no reason for neglecting them. On the contrary, the possibility that they may lead to such an unfortunate result should make the practitioner watch them carefully and treat them rationally.

Whatever may be the cause or the structure of a polypus, its tendency, as soon as it has germinated, is to indefinite continuance and growth. Should the tissue from which it springs return to a normal condition, it is possible that the growth might die and drop off spontaneously, — though I have never seen an instance of this sort. Its ordinary course is to live and grow indefinitely. In its infancy it produces very little irritation or pain. It may exist for a time unheeded. Before long, however, it pours out an unhealthy discharge, increasing the previously existing otorrhœa. I have often watched the surface of a polypus, after carefully cleansing it of all discharge, and seen the secretion ooze out from the cleansed surface in minute drops, just as one may see water ooze out from the mucous membrane of the inside of the lip, if he will take the trouble to turn the lip down before a glass, wipe it dry and watch it there for a moment. The increased otorrhœa attendant upon a polypus is often the only reason why a patient seeks advice ; and he first learns of the existence of a polypus in his ear from the examining surgeon. Whenever the growth becomes so large that it presses upon the walls of the meatus or other parts, it produces irritation and pain. Tenderness, swelling,

and the other signs of inflammation soon appear, and the suffering which results is often intense.

Another characteristic of both kinds of polypi of the ear is a tendency to reproduce themselves after extraction. This is what might be expected from the manner of their growth. After extraction the soil from which they have been taken remains unchanged, and their germs are in it. The same perverted nutrition remains, and a new polypus is pretty sure to spring up in place of the old one. If the roots of a polypus are thoroughly destroyed after extraction, by cauterization or other means, it is less likely to reappear. It is worthy of notice also that a fibro-plastic polypus is not so likely to grow again, after extraction, as an epithelial one. But neither of them will reappear, after removal, if the morbid condition of the parent tissues from which they grow can be brought back to a healthy state. This fact points to an important indication for treatment.

Sometimes several polypi grow in the same ear at the same time. When this is the case, the different individuals usually, but not always, belong to the same class. A fibro-plastic polypus may inhabit the meatus with an epithelial one. If *all* of the tissues of the ear are diseased in such a way as to induce foreign growths therein, the two kinds would be likely to germinate and grow together. Commonly, however, the morbid condition of one of the tissues predominates over that of the others.

A polypus does not disturb the hearing, except so far as it is a mechanical obstruction to the entrance of sound into the external auditory passage. If the growth is small, it may not interfere with the hearing at all. If it is large, and blocks up the meatus like a plug of wax, it will seriously interfere with audition. But the condition of the parts from which it grows is often, perhaps generally, such as to prevent, more or less completely, the propagation of sound into the internal ear.

Hence it may happen that the removal of a polypus will exert no influence upon the hearing power of the patient.

It is rare for any of these growths to endanger life. Yet it is not impossible for them to do so. I recollect the case of a patient out of whose meatus I extracted a polypus; and who, for two or three days before its extraction, suffered from headache, intolerance of light, nausea, vertigo, stupor, and fever. All of these symptoms disappeared as soon as the growth was removed. The irritation and inflammation induced in the ear and its neighborhood by the presence of a polypus may extend at any time to the brain. It is never wise to leave one in the ear if it can be destroyed. If it does not take away life, it is a constant source of discomfort, and becomes itself a cause of disease in the surrounding tissues.

If this description of the natural history of polypoid growths of the ear is correct, and we may rely on the results of treatment in the previously recorded cases, it is not difficult to make out the prognosis or the indications for treatment.

The prognosis, so far as the polypus and the otorrhœa are concerned, is generally favorable. The growth can nearly always be eradicated and the otorrhœa stopped. So far as the hearing and the restoration of the tissues to a normal state are concerned, the prognosis is doubtful. If deafness results from mechanical obstruction to the waves of sound by the polypus, the former will be relieved by the removal of the latter; but if such is not the case, — and it is not often, — only a slight improvement of hearing can be expected after extraction. An appropriate treatment may lead back the tissues to a healthier state than that which accompanied a polypus, but not to a normal condition.

It is important, however, in giving a prognosis, to dwell with emphasis on the necessity of perseverance in treatment. It is not a remarkable occurrence for the patient or his friends to weary of the treatment and renounce it. Perhaps this is

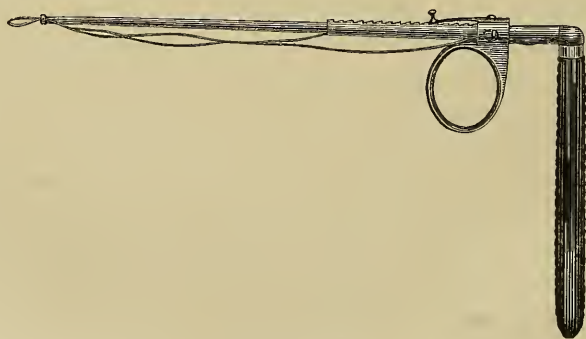
not surprising. The local disease, i. e. the growth, is generally out of sight. The patient can neither see it, nor watch the effects of treatment. As the otorrhœa does not abate at all, or very little, till the growth is destroyed and the condition of the meatus improved, the patient may be obliged to go through weeks, and perhaps months, of what seems to him ineffectual treatment, before he is relieved. After a while his faith in the ability if not in the honesty of his surgeon gives out, and he renounces an apparently hopeless task. In order to guard against this, the surgeon, while giving more or less of a favorable prognosis, — which he may almost always do, — should add to it a caution about the necessity of a perseverance in treatment equal to the obstinacy of the disease.

The indications for treatment are twofold : first, to remove or destroy the growth ; and secondly, to restore the tissues to as healthy a state as possible. The first indication may be accomplished by extraction or cauterization, or by both of these measures combined, and sometimes by injection into the substance of the tumor. The second indication is answered by counter-irritation, the use of astringents, syringing, leeches, and such constitutional measures as may be required. Each of these points deserves a separate consideration.

1. *Extraction.* The ease and thoroughness with which a polypus can be removed from the ear depend as much upon the character of the growth as upon the instrument employed for its extraction. If the growth is soft, bleeding easily when touched, and adherent by a large base, it is not an easy matter to extract the whole of it at once. It will break up in the grasp of the instrument, and only come away in pieces. If it is firm, or can be rendered so by the application of astringents to it, and is not attached by a broad base, it can be easily and completely removed by a single operation. As a general rule, fibrous growths are firmer than epithelial ones, and are consequently more easily extracted.

When the meatus is swollen and tender, no attempts at extraction should be made till the inflammation is reduced. This can be readily done by means of leeches and blisters. When the surgeon has a soft epithelial growth to deal with, which bleeds freely the moment he attempts to remove it, he should endeavor to render it firmer by the use of astringents. For this purpose I have found solutions of the acetate of lead and of tannin the most useful. The former should be used of the strength of ten or twelve grains to an ounce of water ; the latter may be used of any strength. It should not be forgotten, that when tannin is rubbed up with glycerine, it makes a better solution than if it is dissolved in water alone. These astringent solutions should be instilled into the meatus three or four times a day, for several days, before any attempt at extraction is made. As soon as a polypus has become hard and firm, it is usually an easy matter to remove it.

The best instruments for the operation are the ring-lever forceps of Mr. Toynbee of London, and the wire snare of Mr. Wilde of Dublin. The wire snare is peculiarly adapted to the removal of large growths, — of those which nearly or completely fill the meatus. With the modifications that I have given to it, it is admirably adapted to its purpose. The instrument, with these modifications, is represented in the adjoining figure.



Wire Snare.

It consists of a steel bar, with a convenient handle fixed at right angles to the bar; a slide, and ratchet, and wire. The wire passes through two small holes in the cap which covers the small extremity of the bar, and can be fashioned into a loop of any requisite size. The slide, which moves the wire and contracts the loop, is manœuvred by a trigger. By this arrangement neither the instrument nor the hand of the operator obstructs the view of the meatus during an operation.*

The ring lever forceps is a more convenient instrument for the removal of small growths, but cannot grasp large ones. There are no directions which it is necessary to give for the performance of the operation itself. It is only important to see that the polypus is well within the grasp of the instrument, and then to firmly and gently extract it.

2. *Cauterization.* The extraction of a polypus is by no means the most important part of its treatment. In most cases it will sprout and grow from its root, unless efficient measures are taken to prevent this. For this purpose caustics in various forms are generally used. I have found nitrate of silver and potassa fusa to be the best. The latter can be easily and safely applied in the following manner: Pack a thin layer of cotton, previously moistened with acetic acid, closely along the wall of the meatus, and, if possible, a little beyond the root of the polypus. Then melt a bit of potassa fusa in a test-tube over a spirit or gas lamp. Dip the end of a probe—one whose end has been roughened a little is preferable—into the melted caustic. Do this once or twice, till the end of the probe is coated with it. As soon as enough of the caustic potash is collected on the end of the probe, pass it into the meatus and apply it thoroughly to the growth. A single application will sometimes be enough to destroy it completely. Should any of the caustic happen to drop from the probe

* The instrument is manufactured by Messrs. Codman and Shurtleff, Tremont Row, Boston, and can be obtained from them.

while in the meatus, it will be caught on the cotton and neutralized by the acid. I have often applied potassa fusa in this way to growths in the meatus, and have found its application easy and safe. I have not thus far met with a single disagreeable accident from its use. I have never applied it to growths within the cavity of the tympanum.

Nitrate of silver possesses the advantage over potassa fusa of greater ease of application. On the other hand, it is less efficient. In order to apply it accurately to the desired spot, it should be fused around the end of a silver probe or of a platina wire.

Whatever form of caustic the surgeon selects, he should apply it carefully and thoroughly to the whole root or excised surface of the growth. The application should be repeated every second or third day, till no remains of the polypus are visible. The previous cases show that this must sometimes be repeated for a long time. It is scarcely necessary to speak of the importance of a strong light while making any of these applications. It is impossible to make any of them without it. Sunlight, reflected into the meatus by means of a mirror so that its rays pass into the ear horizontally, is the best method of illumination.*

3. *Injection into the substance of the tumor.* A solution of the perchloride or persulphate of iron may sometimes be injected into the interior of a polypus with the happiest results.

* Of the necessity of a complete illumination of the external meatus for the purpose of a satisfactory examination of it, and especially during the operation of extracting a polypus, there can be no doubt. But I do not think it is of much importance how the light is obtained, provided, only, that the surgeon has enough of it. I have been in the habit of using a simple mirror, attached by a universal joint to a vertical standard, upon which it can be moved up and down. The mirror is employed as a reflector, and when there is any sunshine, it will throw a flood of horizontal rays of sunlight upon the ear. This method of illuminating the meatus is a most satisfactory one. When there is no sunlight the reflector of Von Trötsch answers an admirable purpose. The speculum of the late lamented Mr. Toynbee is one of the best for the ear that I know of.

Two or three drops of the liquor ferri perchloridi, or of the liquor ferri persulphatis, can be easily injected into a growth by means of a syringe, such as is used for subcutaneous injections. The result is sometimes the immediate destruction of the polypus. The following case was treated in this way.

Case 13. H. B., a young man nearly twenty years old, had been troubled with an otorrhœa, from each ear, from childhood. When quite young he had scarlet fever. I saw him soon after the fever. There was then a large perforation of each membrana tympani, and considerable discharge. An appropriate treatment was instituted and carefully followed. As he grew up, the discharge gradually diminished, but never totally ceased. The walls of each meatus were thickened. The discharge appeared to proceed chiefly from the cavity of the tympanum. Until he was thirteen or fourteen years old, I was in the habit of examining his ears every three or four weeks. At last they got so well that he ceased calling upon me. His general health was excellent. His hearing was impaired, but not seriously injured. He could hear the ticking of my watch twelve or fifteen inches from one ear, and two or three inches from the other. Ordinary conversation he heard easily, but of course not normally. In this condition he remained for several years. When about nineteen years old, he called on me to say that one of his ears had been growing worse for several weeks. The other apparently remained as usual. The only change he had recognized was an increase of the discharge from the right ear, with greater deafness and a sensation of fulness in it. An examination showed that the right meatus was filled with a polypus, which proved to be an epithelial one. After instilling an astringent solution for a few days, so as to harden the growth, it was extracted with the wire snare. Caustic was applied to the root, and strong astringent solutions held in the ear several times a day. In spite of this treatment the growth soon reappeared. It was

again extracted. The root was cauterized. Various astringents were instilled. An aqueous solution of iodine was employed. But the growth again appeared. It was then burnt down by potassa fusa, applied in the way previously described. This burnt it off, but did not destroy it. At length a swelling appeared on the mastoid process. It was opened, and a copious discharge of pus came out. The opening communicated with the cavity of the tympanum so freely, that water, injected by a syringe into the meatus, ran out through the perforation in the mastoid process. The polypus appeared to spring from the cavity of the tympanum, at its posterior part, where the inner end of the mastoid fistula reached. When the meatus was filled with the growth, there was pain in the mastoid region, and increased discharge from the fistulous opening. When the polypus, by extraction, or by the constant application of caustics, was prevented from filling the meatus, and the latter consequently afforded an easy egress for the discharge, there was no pain in the mastoid region, and very little discharge from the opening. Finding that caustics, astringents, and extraction were not sufficient to destroy the growth, I passed the needle of a subcutaneous syringe through it, and pushed the point on till it touched the bone. There I injected three drops of the liquid perchloride of iron. The operation was followed by considerable but not intense pain for ten or fifteen minutes. The growth soon shrivelled up, turned black, and, in about forty-eight hours after the injection, dropped out of the ear, in the form of a black mass. After it came away, I examined the ear, and could not discover a trace of the polypus. It did not appear again. The discharge soon ceased from the mastoid process, and the opening healed. Two or three weeks later, the ear assumed the aspect which it had worn for so many years, and the discharge became again a slight and inoffensive otorrhœa. The hearing, which had been seriously impaired, returned to its previous condition.

This treatment of polypus of the ear by injection is a somewhat novel one. The above is the only case in which I have been able to try it since it occurred to me. The success which attended this will induce me to repeat the experiment when I have another opportunity. In the mean time, I commend it to the attention of others.

4. *Counter-irritation.* Extraction, cauterization, and injection are means of acting directly on a growth itself. The object of the first is to pull out of the meatus all that can be removed. The object of the last two is to destroy what cannot be taken out. None of these act or are intended to act on the walls of the meatus or the neighboring tissues. But we have previously seen that a general morbid condition of the meatus is often, and perhaps may be always, the cause of polypoid growths. Unless this condition is removed, a polypus, however thoroughly it may be extracted or destroyed, is liable to reappear. When, therefore, counter-irritation was used in the previous cases, it was not employed for the purpose of acting directly on a growth in the ear, but with the hope of aiding in the removal of a morbid condition. With this view, blisters, croton oil, iodine, &c. may often be advantageously prescribed. The indications for their use are to be found in the redness, tenderness, and pain of the meatus, which so often attend growths in the ear. Occasionally a continued uneasy sensation in the meatus results from the application of caustic to a polypus. Sometimes otalgia is produced in the same way. This sort of grumbling pain, and the more acute otalgia, are both relieved by a blister, or other counter-irritant. A blister is the best. If the instillation of a solution of acetate of lead or of tannin, in the way just described, for the purpose of preparing a polypus for extraction, produces discomfort in the ear, or actual pain, as it sometimes though rarely will, croton oil should be rubbed over the mastoid process of the affected ear, or a blister should be applied

there. In this way a patient may be made to bear an astringent solution in the ear of a strength which, without the counter-irritant, he would not tolerate.

When a polypus springs from a meatus whose walls are permanently congested, and more or less sensitive and thickened, and out of which a discharge is constantly flowing, it is sure to reappear as soon as it is taken out. Indeed, in some such cases, it seems to grow more exuberantly after extraction than before, as if provoked by ill treatment, or stimulated by being touched. In these cases excellent results may be obtained from counter-irritation, in connection with astringents instilled into the meatus. But to do any permanent good, it should be persistently employed. The counter-irritant should be applied for weeks, and not infrequently for months together. It should not be discontinued, unless otherwise contra-indicated, till the walls of the meatus assume a healthy aspect; or, at least, till they have improved. For this purpose I have commonly used croton oil or iodine. In most cases the former is preferable. At first only a single drop should be rubbed over the mastoid process. As the skin becomes accustomed to it, two or more drops may be applied at once. The application should be repeated every second or third day.

5. *Astringents and Styptics.* Agents of this class were used in the previous cases, and are generally useful, not merely to prepare a polypus for extraction by rendering it firm, but to act on the walls of the meatus, and, if there is perforation, on the cavity of the tympanum. For this purpose a variety of articles may be employed. I have derived the most advantage from the acetate of lead, the sulphate of zinc, alum, tannin, and creosote. Occasionally a weak solution of iodine produces a good result. In a few instances I have seen the walls of the meatus assume a healthy aspect under the influence of the oil of cade, when they have been rebellious to other agents.

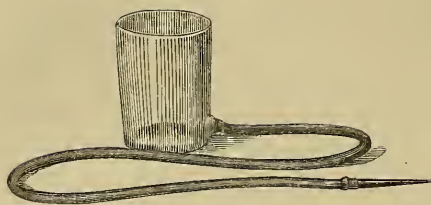
An astringent solution produces much more effect if it is held in the ear, than if it is merely syringed into it. The best way to apply it, is first to cleanse the ear thoroughly by means of a syringe. Then direct the patient to lay his head down on one side, with the affected ear uppermost, and in this position fill the upper ear with the solution. Let it remain in the ear for several minutes. After it has thus been kept in contact with the walls of the meatus, or the cavity of the tympanum, or both, for a sufficient length of time, the head may be turned over and the solution allowed to run out. This process may be repeated with one or both ears once daily, or several times a day, according to the indications of each case.

The strength of an astringent solution when used in this way should depend on the amount of active inflammation present. If the walls of the meatus are of a bright red color, and swollen and tender and painful, they will not bear any astringent solution, however weak. If they are more or less red, with little or no tenderness and pain, and only moderate swelling, astringents are well borne, and do good when not too strong. In chronic cases, in which the walls of the passage have been changed into a sort of permanently secreting surface, and in which there is generally very little tenderness or pain though there may be decided redness, astringent solutions, however strong, act kindly. In the latter case I have frequently employed the acetate of lead, of the strength of ten, twelve, and fifteen grains to an ounce of water; the sulphate of zinc, as strong as three and four grains to the ounce; tannin, of the strength of twelve and fifteen grains to the ounce; and alum in a saturated solution; and sometimes I have blown pulverized alum through a tube into the meatus, and as freely as possible upon the membrana tympani, and, when a perforation existed, into the cavity. But it is only in chronic states that the ear will bear astringent solutions of such strength.

A condition of the meatus, just alluded to as a sort of per-

manently secreting surface, not infrequently coexists with polypoid growths. Astringents do not seem to produce much effect upon it. Under these circumstances a good result is often obtained by rubbing thoroughly into the walls of the meatus a solution of nitrate of silver, of the strength of a *dram of the salt to a dram of water*. The application should not be made till the parts have been well cleansed. It may be repeated every second or third day. I have frequently done this. Except a trifling amount of pain for a short time after the application, it produces no disagreeable effects. After a few applications the walls of the passage assume a healthier aspect. Astringent solutions may then be resorted to with greater hope of advantage from them. Iodine, dissolved in water by means of the iodide of potassium, is occasionally of great service in these cases. It is rarely borne of a strength greater than two grains of iodine to an ounce of water. It may be instilled into the ear and held in it for several minutes. It is not well to use it more than once a day. It sometimes causes a moderate degree of tenderness and pain. When this is the case the strength of the solution should be diminished, or it should be less frequently applied. I find it difficult to describe the class of chronic cases in which the local application of iodine has proved to be the most useful, and yet it is not difficult to recognize them by inspection. When the walls of the meatus, or of the cavity from which a polypus has been taken, present a rough and granulated surface, that does not yield readily to cauterization with nitrate of silver or potassa fusa, and continues, notwithstanding the use of astringents, to send out from its little red points a dirty secretion, that disturbs the patient and wearies the practitioner, a solution of iodine instilled daily into the meatus may do good. The granulations are repressed by it, and often permanently destroyed. Cases 4 and 8 are illustrations of this treatment. In them, the beneficial action of iodine was marked.

6. *Syringing.* The importance of keeping the meatus clean in all cases of otorrhœa, whether dependent on polypus or otherwise, is so obvious that I need not dwell upon it. My object in alluding to syringing now is for the purpose of referring to the syringe itself. The syringe of the surgeon is probably always a good one. That of the patient is pretty sure to be a bad one. Add to this the unskilfulness of the patient or his attendant in the use of the syringe, and we may be sure that a meatus which needs cleansing is rarely properly cleansed except by the surgeon himself. And yet an ear often requires the syringe several times a day. It should always be cleansed before any astringent or other wash is instilled into it. The ear syringes which are generally sold are made of gutta-percha, or glass, or German silver, or pewter. They are of small size, and rarely hold more than an ounce or an ounce and a half. The packing of the piston is frequently so imperfect that a sufficient vacuum is not produced; or, if the packing is tight, the piston works with a jerk, and cannot be moved smoothly back and forth. Moreover, as I have just intimated, the imperfections of the instrument are often enhanced by unskilful management of it. The result is that the patient, generally a child if not an infant, is often pained by the performance of an operation which should always be painless and might be grateful. At length the patient gets weary of going through with a disagreeable performance, and refuses to submit to it, except when performed by the surgeon. At least this is not an uncommon result. Now much of this would be obviated by simply using an instrument that works smoothly and properly. Such a one cannot be got without paying a larger price than many can afford to give. One which will hold two or three ounces is preferable to a smaller one. But simpler, better, and less costly than any syringe, is an ear douche, which I have modelled after the plan of Dr. Thudicum's nasal douche. It consists of a glass jar,



Ear Douche.

to the side of which, near the bottom, a flexible tube is attached. The jar holds about half a pint. The tube is three or four feet long with an appropriate nozzle. In

order to use the douche, it is only necessary to introduce the nozzle into the orifice of the meatus, and then raise the jar to a height sufficient to send a current of water through the pipe into the ear. By this means a steady and continuous current is secured. It may be made gentle or forcible by elevating or lowering the jar. It cleanses the ear thoroughly and painlessly.*

7. *Leeches*. Foreign growths in the ear frequently lead to the prominent symptoms of inflammation, viz. pain, swelling, redness, and heat. When one or more of these exist, leeches often aid in reducing them. In this way they are indirectly of service in the treatment of polypus. They do not, of course, exert any direct action on the growth itself. It often happens that the walls of a meatus are so swollen in consequence of the presence of a foreign growth, that they cannot be easily seen; and, at the same time, they are so tender that the patient will not permit an exploration with the probe. Both the swelling and tenderness may be removed by leeching. When they are gone it is easy to see a polypus and expose its character and attachments. It sometimes happens that a certain degree of inflammation is produced in the meatus by the application of caustic, or by attempts at extraction. Here again leeches may be used with advantage. It is well to remember that more blood can be abstracted if leeches are

* The Ear Douche can be procured of Messrs. Codman & Shurtleff, Instrument dealers, Tremont Row, Boston.

applied in front of the auricle, than if they are put back of it on the mastoid process; and the meatus is more effectually drained by leeching the former than the latter locality. Two leeches, one applied on the root of the tragus, and the other in the hollow of the concha, will abstract nearly if not quite as much blood as double that number applied on the mastoid process. But in young children leeches should always be applied on the process. Otherwise the bleeding from the bites might be dangerous. In adults I prefer the front of the ear. When there is no swelling, tenderness, or congestion, leeches should not be used.

8. *Constitutional Measures.* It has already been stated that the general condition of the system does not appear to exert a marked influence in the causation of aural polypi. In eleven of the previous cases, the general health was good. In two—that is, in rather less than one sixth—of them it was poor. When a polypus springs up in the meatus of a strumous or weakly person, it finds there an appropriate soil; and consequently grows luxuriantly, and is not so easily eradicated as under other circumstances. When such is the case, the surgeon should sedulously employ all means in his power to invigorate the general health, while he combats the local disease by an appropriate local treatment. It is not necessary to describe these measures in detail. Iron, quinia, iodide of potassium, cod-liver oil, a nourishing diet, exercise, change of air, etc. may be used according to the indications of each case. But unless there is some vice in the general condition of the system, none of these measures will do any good. They cannot exert any direct influence on the growths themselves. It is always to be borne in mind that whatever tends to keep up an unhealthy state of the meatus favors the production and persistence of polypi; and whatever tends to bring about a healthy state of the meatus when it is diseased aids, if not in their destruction, in rendering them less likely to reappear when destroyed.

GRANULATIONS.

The small red granulations, *excroissances charnues*, or fungoid growths, which sometimes appear on the surface of the membrana tympani and on the walls of the meatus, are similar in their structure to the polypi of the ear which have been previously described. Like the latter, they are the result of a morbid state of the tissues from which they grow, and are apt to persist till that morbid state is removed. They sometimes reappear with wonderful pertinacity after they have been apparently destroyed; and, by so doing, task severely the patience both of the patient and surgeon.

When they exist they can be easily recognized, provided the meatus and surface of the tympanal membrane have been well cleansed from all discharge and are exposed to a clear light. When examined in this way they look like a cluster of enlarged papillæ of irregular size and shape. Sometimes only one or two such granulations crop out from the surface of the tympanum or wall of the meatus; and in other cases a cluster of half a dozen may be seen nestled together. They do not grow exuberantly. In this respect they differ materially from polypi. I have a few times improved the opportunity of observing a group of them in the ear, at intervals, for more than a year, and could not discover, from month to month, that they changed materially. Perhaps the cluster might enlarge a little in number, one or two being added to the group; but the individuals of it did not seem to increase in size. They constantly presented the same granulated, raspberry appearance, and were unceasingly occupied in pouring out an unhealthy and dirty secretion.

They can be destroyed more easily by direct cauterization than by any other method. For this purpose I prefer the solid nitrate of silver, or potassa fusa applied in the manner previously described. I have sometimes used chromic acid with

satisfactory results, and have occasionally seen them shrivel up after the application of the perchloride of iron to their surface. In obstinate cases it is well to remember that the insufflation of pulverized alum into the meatus, which can be easily accomplished through an appropriate tube, so as to reach them, may destroy them. Tannic acid may be used in the same way. Both of these articles, if they are employed for this purpose, should be applied daily. If their continued application is followed by soreness or pain, the use of them should be discontinued for a few days. They rarely produce any inconvenience. If there is much, the application of a leech in front of the ear, or of a blister over the mastoid process, will remove it. The insufflation of alum or of tannin has the advantage of such simplicity of application that it does not require the hand of the surgeon. It may be done by an attendant of the patient. On the whole, however, I prefer, as stated above, the solid nitrate of silver or potassa fusa. A daily application of one or the other of them will very soon destroy a cluster of fungoid granulations. The caustic should be applied till they are eaten down considerably below the surface which produces them. Otherwise they will reappear as soon as the treatment is discontinued. The measures which have previously been indicated as necessary for the purpose of restoring the tissues of the ear to a healthy condition, in the case of polypoid growths, are equally important in the treatment of fungoid granulations. These measures have already been described in sufficient detail, and need not be referred to again.



